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## AWARDS

### Australian PC Buyer

November. The Dell Dimension L500c was rated #1 in the Value Desktop Category.  
December. The Dell Dimension L500c was rated #1 in the Business PC category.

### Australian PC World

November. The Dell Dimension T500 won #1 in the Home Best Buy category.  
January 2000 - Dell Dimension XPS T700 was rated second in "Best Home and Business PC".  
January 2000 - Dell Dimension L500c was ranked second in "Best Business PC Buy".

### Top products of 1999

The Dell Dimension XPS T500 was rated The Best Home PC of 1999 by the editor and readers alike.

### Australian PC Authority

T550 won a "Recommended Award".  
December. The Dell Dimension T550 won a "Recommended Award".  
January 2000 - Dell Dimension XPS T550 was named "Ultimate PC".  
February 2000 - Dell Dimension XPS T550 received the recommended award for the ninth month in a row.  
February 2000 - Dell Inspiron 3700 awarded Excellence Award.  
February 2000 - Dell Dimension XPS B733 received the speed award in the Super PCs category.

### Internet.au

April 2000 - rated the Dell Latitude LS as top of its "Hot Products" section.

**Australian Personal Computer**  
December. The Dell Dimension T500 won "Editors Choice Award".

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- Turtle Beach Montego II 320Voice PCI Sound Card
- ➔ **FREE Upgrade: SoundBlaster Live! Value 576Voice Sound Card**
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- ➔ **FREE Upgrade: 12X Max Variable DVD-ROM Drive and Software Decoding**
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- 17" Colour Monitor (15.9" v.i.s.)
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- Conexant™ V.90/56K Modem for Windows
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DELD024





Dell Dimension™ T Series<sup>®</sup> photographed with options:  
17" flat panel monitor and Altec Lansing ADA 880 speakers.



Dell Inspiron™ 5000



Dell Precision™ 220 pictured with  
optional 17" flat panel monitor



Dell PowerEdge™ 2400 Server

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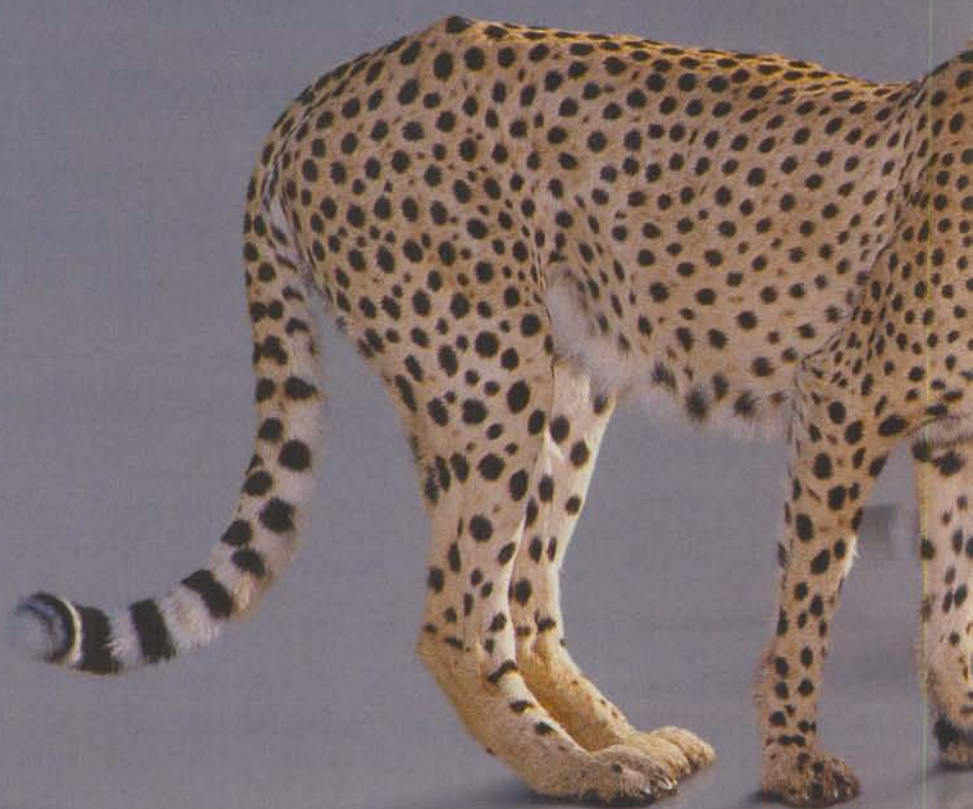
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# EDITORIAL



## The end of an era?

It's confirmed. The computer industry moves far too quickly for the legal system. The length of the DOJ case against Microsoft is living proof. Yes, Microsoft exploited its OS monopoly to gain dominance in other market segments. So what? The appeals process will drag the case well beyond any meaningful time frame.

The muted response to Jackson's findings of law (from the media, if not the financial markets) only underscores the fact that the platform is becoming esoterica. To the masses lured by the Internet, the operating system and hardware they use are about as important as the brand of firmware in their mobile phone or the chip their microwave uses. People are increasingly interested only in the application and content, not the platform.

Fundamentally, the Net *is* software, or is becoming so. The big developments in software are happening online, and most of the resulting software will be accessible through a Web browser or other protocol decoder such as an instant messaging client. In time, the majority of people will never see the nuts and bolts, or have to worry about learning how to use and configure a particular OS platform. Most Internet software is equally accessible on all platforms — the beauty of open standards.

The best example of this phenomenon is the very thing that kicked off the whole DOJ case. The 'integration' of the browser into the operating system by Microsoft was not an attempt to enhance the operating system — it was an attempt to squash a technology that represented a potential threat to its operating system business. The browser was set to replace Windows as the interface to applications.

On the surface, it appears Microsoft won. Netscape sold out to AOL, the browser was never anything more than a browser and the status quo was maintained.

I think it's really more a case of Microsoft delaying the inevitable. The AOL-owned Netscape/Mozilla is in a better position than ever to dominate the Web landscape (but I'm not sure how it's going to make money). The open source Gecko rendering engine can and will be ported to every conceivable platform.

In the same way, I believe Linux will be a player, but not in the way everyone thinks. The current trend seems to be to develop consumer devices tailored around a specific application, and the PC is the device that can run all applications. The appeal of Linux is that it is open source. Developers can take the kernel and apply it to a number of hardware platforms easily. It's a just-add-water OS. In the short term, the growing number of open source applications also gives developers a ready source of widgets and do-dads they can add to their platforms quickly, but ultimately it's the browser that will be the interface to the major applications.

Of course, this shift won't happen overnight. In the meantime, we'll continue to look forward to fiery outbursts every time there's a suggestion that somebody's favourite operating system is not perfect. While the OS zealots bicker, the rest of the world will be getting online, and caring about the content, not the mechanics.

*Nathan Taylor*

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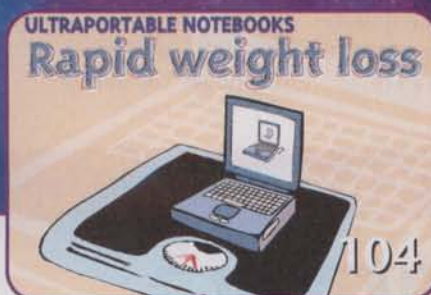
## COVER STORIES

## Ultrafast Ultraportable



Up until now, multiprocessing was a pipe dream for most consumers. The release of Windows 2000 has opened up opportunities for multiprocessing systems that are useful for more than just workstation and server applications.

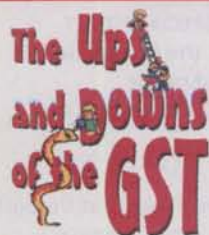
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We all wish that someone would come up with a light and portable notebook that doesn't cut back on either power or performance. Could such a thing already exist? See our review of ultraportables to find out.

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Most people are still unsure which purchases they should make before the GST hits, and which they should postpone to save money. What prices will you pay come July 1?

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## REVIEW



As the diversity of Internet appliances grows, consumers are facing a bewildering array of choices. APC checks out the first models to hit the Australian market.

## Products reviewed:

Ericsson iPhone	Nokia 9110 Communicator
Ericsson MC218	Sega Dreamcast
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Almost 18 months after the US Department of Justice began court action, Microsoft has been found guilty of breaking antitrust laws. APC reviews the significance of the finding.

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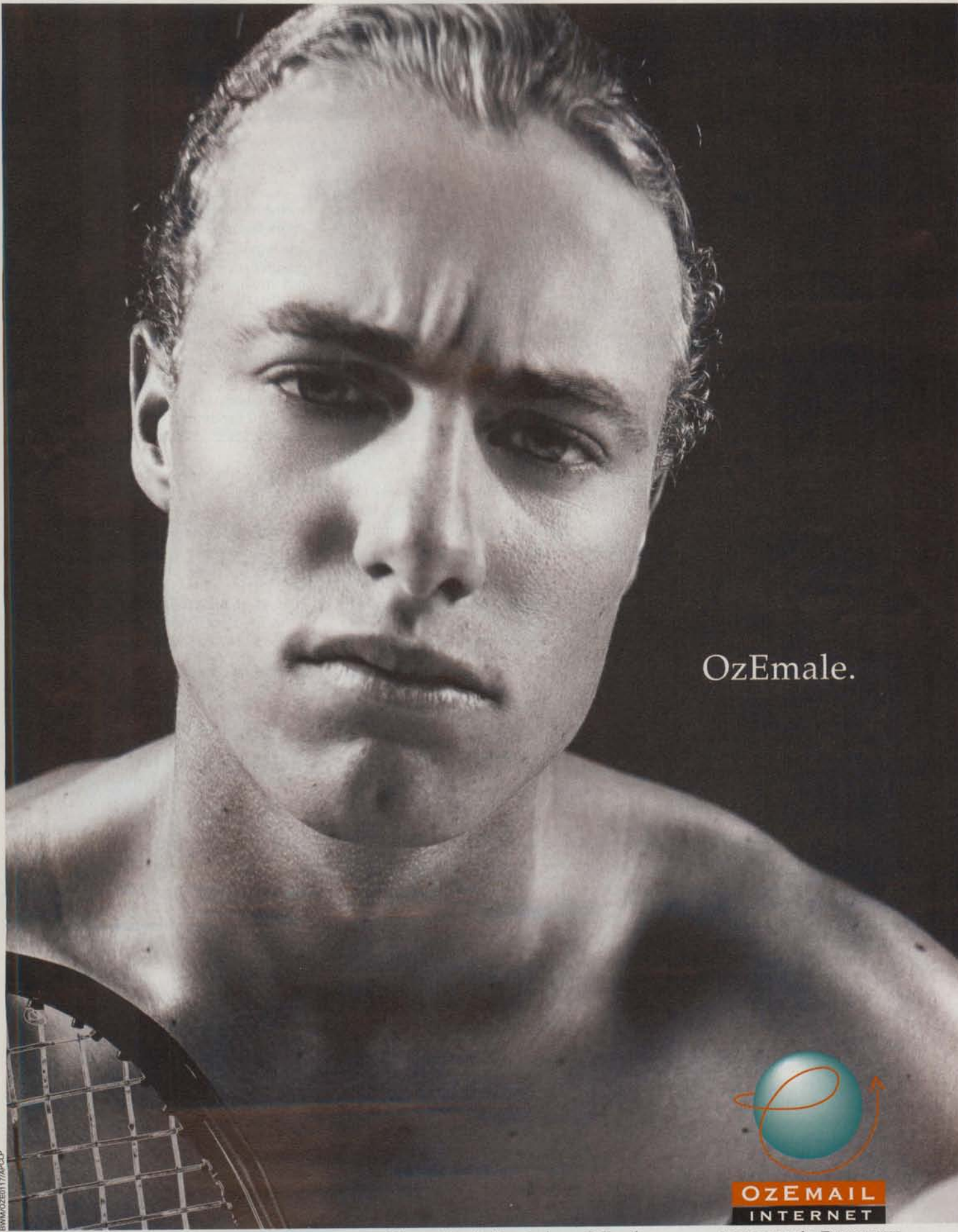
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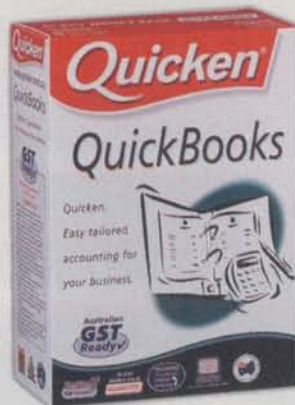
## What's hot on APC June CDs

### FULL VERSION + UPGRADE OFFER

### Quicken QuickBooks 6

QuickBooks is still the best accounting software available. It's easy to use, provides complete tax and account management, and handles customer and sales management, supplies, billing and contact details.

QuickBooks 6, provided on CD 2, is fully capable of working this year's accounts. It's a complete version, worth \$200. You can build your own GST capability into QuickBooks 6, or upgrade to QuickBooks 7.



As an exclusive to APC readers, Quicken is offering substantial discounts on upgrades to QuickBooks 7. Simply install and register QuickBooks 6.0 from this month's cover disc by calling 1300 650 061. Then, instead of paying \$199.95 for QuickBooks 7, for instance, you need only pay the upgrade price of \$99.95. You can save up to \$300 on QuickBooks products.

This offer expires July 15. The special price is available through leading software retailers, or call Quicken sales on 1800 101 088. See CD 2 for details.

## GST accounting packages

APC also has trial versions of all the major accounting packages on CD 2.

### Products include:

Attache Catapult, Easy Books, ezBooks 1.0, Instant Accounting 98, Money 2000, MYOB Accounting Plus 9, MYOB FirstAccounts

3.1.1, QuickBooks Pro 7, Simply Accounting 7.0

See GST accounting package reviews on page 86.

## Get interactive

CD 2 contains the best of the Web's players, plug-ins, viewers and editors. Our feature section includes 30 image editors, multimedia creation tools, media players, animation packages and browser add-ons.

### Products include:

Adobe Acrobat Reader 4.05, Adobe After Effects 4.1, Adobe Photoshop 5.5, Adobe Premiere 5.0, Alien Skin Eye Candy 3.01, Alien Skin Xenofex, AudioSphere 2.0, Cakewalk Pro Audio 9.0, Dreamweaver 3.01 updaters, Fireworks Import Xtra for Director, Macromedia Director 8, Macromedia

Dreamweaver 3, Microsoft Windows Media Player 6.4, MODPlug Player 1.40, Napster 2.0b5, Netscape Flash Plugin 0.4.9, Paint Shop Pro with Animation Shop 6.02, Real Player 7.0, Ulead GIF-X.Plugin 1.0

## Games galore

APC has provided a gamut of games. From action games to Windows card games, we've got all the best, on CD 1 and CD 2. Reviews of games on CD 1 are on page 185.

### Products include:

Star Wars: Force Commander, ANNO 1602, Battlecruiser 3000AD, Nerf Arena Blast, 3D

Goldrush Free, The Curse of Ra, Cubemaster 2000, Hang2000, Hex Mines, Kawasaki ATV PowerSports, Marble Crazy, Numbers, Renex, Star Wars: Ultimate Battle Arena



## Your guide to the cover CDs



**apcmag.cd** complements both the magazine and **apcmag.com**. Each month's disc collection features software related to articles in that issue, as well as special CD-only features and the latest Web browsers, OS patches and popular tools.

Each piece of software includes instructions on whether you will need to unzip the file before installing it, and most also include README files. A complete list of software included on this month's discs is included on the CD cover.

**apcmag.cd** has been created in HTML. You do not need any special software to access the discs, other than a standard browser.

The CDs have been tested using Netscape Navigator 3.0 and 4.0, and Microsoft Internet Explorer 3.0 and 4.0.

All software on the CDs is provided as is, without any warranty, express or implied. Complete terms and conditions are included on the CD itself; click on the Conditions of Use link for details.

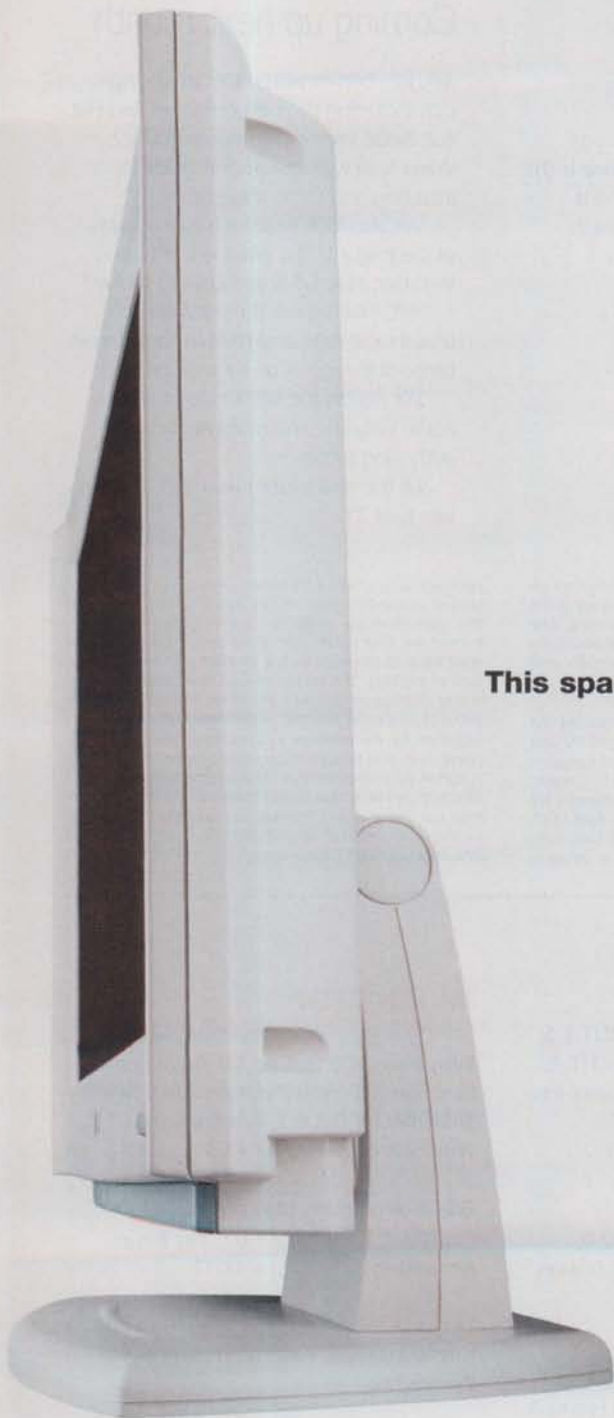
## How to run the CDs

Before using the CDs, please read the Conditions of Use online at **apcmag.com/apcmag.cd**. These CDs use an Autorun feature for Windows 95, 98 and NT systems. Just insert **apcmag.cd** and your browser will automatically load with the **apcmag.cd** front page. Users of other platforms can simply launch their favourite browser and load the file **DEFAULT.HTM** in the root directory of the CD. For further information, see the instructions on the back cover of the CD.

You should carefully read the licensing agreements and honour any evaluation or shareware terms specified, read all instructions and README files, and virus-check every program before use.

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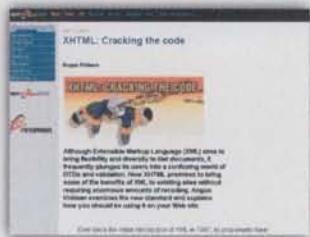
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## NewsWire

<http://newswire.com.au/>

APC's **NewsWire** service offers the most comprehensive online technology news coverage in Australia. **NewsWire** is the only 100% local IT news service, and is updated continuously throughout each business day.



## Coming up next month

APC July comes with a special OS triple CD, including the full versions of Red Hat 6.2, BeOS Personal Edition and OS/2 Warp 4, as well as a pocket guide to installing and using these OSes.

We also look into the future of each of the major OSes. What will Windows Whistler, Mac OS X and Linux 3 be like?

APC investigates the possibility of timed local calls, and reviews the Internet censorship legislation six months on.

We review the latest video cards, audio software and multimedia authoring software.

All this and a lot more in APC July, on sale June 21.

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### Subscription promotion (page 96)

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## More software on CD 1

### NEW AND HOT

#### WINDOWS

A1 Visual Contact 1.45, Axialis Professional Screen Saver Producer, BillPower 3.5, Borland C++ Compiler, Easy CD-DA Extractor 4.0.2, ExcelRecovery 2.1.21, Folder Remarker 2.0, Land That Job 2.1, PHP Engine 4.0 RC1, PowWow 4.0, Program Which Restores Windows 95/98 1.5, Rosoft CD Extractor 1.08, Time and Chaos 5.3.8, UltraEdit-32, Unique Filer 1.4, WinMorph 2.01, Word Recovery 1.0.21, ZoneAlarm 2.1, SpotOn 1.0.159

#### MAC

ACE 1.7.3, AppearanceHopper 1.9.1, Drag'n Back 3.2.1, eHoroscope 1.1, FoldersSynchronizer PPC 1.8.8, Ghost Hunter 1.6, HTML Optimizer Pro 1.5.1, IPNetMonitor 2.4.3, Kineticon 1.7, MacMAME PPC 0.37 Beta 1, MacOS Items Manager 1.6.2, MoonMenu 1.1, Net Chronometer 1.4.4, NetFinder 2.1, OneApp Slide Show 5.3.2, Rainbow Painter 1.9.0, REALbasic 2.1, SnapperHead 1.3, The MP3 Alarm Clock 1.1

#### LINUX

AbiWord 0.7.8, CDBackup 0.5.2, DDT 1.5, DNSMan 0.3, DOSEMU 1.0.0, egcs-1.1.2, gFTP 2.0.6a, GRecord 0.3.1, mail2news-easy 2.5, QHacc 0.5, SSH Secure Shell 2.1, VCD-Tools 0.2, Web Designer 0.1.3

#### PALM

ChessGenius 1.1, Color SketchPad 2.0, FireViewer 3.5.1, GeekTools Pocket Edition 1.1, Silicon Investor 1.0

#### EPOC/PSION

Data Query Express Plus 1.0a, eSync 2000, Qualcomm Eudora Pro Edition 1.0, HotKeys 3.0, HTML Converter 1.2, JWIN 2.10F, SaveMail 2.50

#### WINDOWS CE

Act for Windows CE 1.01, pcAnywhere CE, PowerToys 2.0, SupplyPredictor 1.0, Wave Drummer 1.00

#### GAMEZONE

Star Wars: Force Commander, ANNO 1602, Battlecruiser 3000AD, Nerf Arena Blast

### WORKSHOP

**Windows:** CoffeeCup GIF Animator 4.0, InoculateIT Personal Edition 5.0.1, SiSoft SANDRA 2000.3.6.3, WindowBlinds 1.2, Windows Commander 4.03

**OS/2:** Answering Machine/2 1.99d, CapiTel 3.37, FAM/2 1.07, The Basic Answering Machine for OS/2

**Linux:** Chili!soft ASP, Citrix Metaframe Client, Ethereal, Nessus, Virtual Network Computing

**Mac:** Anarchie Pro 3.7, Fortify 2.2.6, ICQ 2.0 Beta, iVisit 2.3b7, OptimaHTML 2.0

#### Internet Toolkit

Adobe Acrobat Reader 4.0, Eudora Light 3.06, Free Agent 1.11, Go!Zilla 3.5, mIRC 5.6, RealPlayer G2, WinZip 7.0, WS\_FTP LE 5.06

#### Browsers

Microsoft Internet Explorer (32-bit) 5.01, Netscape Communicator 4.7, Netscape Navigator 4.08, Mozilla Milestone 15



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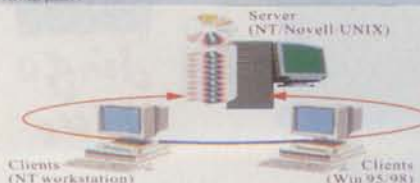
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## TROUBLE AHEAD

### DOJ: Break up Microsoft

**A**s expected, the US Department of Justice (DOJ) has demanded software giant Microsoft be broken up into two companies.

In their submission to Judge Thomas Penfield Jackson, the DOJ and 17 US state attorneys-general have proposed that the company be split into two separate entities: an operating systems business and an applications business.

The proposal follows Judge Jackson's ruling that Microsoft violated antitrust laws by using its dominance in the operating system market to stop other competitors from entering the browser market.

Microsoft chairperson Bill Gates has blasted the proposal, and said it will be detrimental to both consumers and the technology industry. "Microsoft will be greatly damaged by this kind of split," he said.

CEO Steve Ballmer said Microsoft will continue to work "in good faith" with the government to resolve the dispute.

**Roulla Yiacoumi**

See APC's special report on Microsoft on page 66.

## SHARE PRICES CRUMBLE

### The crash we had to have

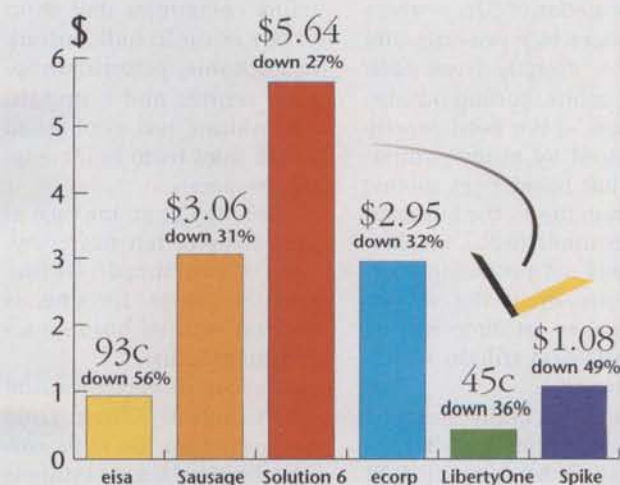
**F**or months, analysts had been making dire predictions that the technology stock bubble was about to burst, and all the while the valuations placed on dot coms spiralled even further out of control.

On Monday April 17, 2000, the Net stock dream came crashing down. Sparked by dramatic falls on the New York Stock Exchange and Nasdaq in the US, the Australian share market suffered its biggest one-day drop in two years, as the All Ordinaries slumped by 176 points.

Technology stocks bore the brunt of the investor sell-off, and volatile stocks were the hardest hit. One of the worst off was Web services company Spike, whose shares shed a massive 49% in value to be worth just \$1.08, well below its \$1.45 issue price.

LibertyOne was also in trouble. With a Nasdaq listing on the horizon, a 36% drop in its shares to just 45 cents was the last thing the Web media company needed.

ISP eisa was hit even more severely. It plummeted 56%



to 93 cents, jeopardising its ability to come up with the cash to buy OzEmail's consumer business (see 'eisa inches towards OzEmail funding', page 24).

Even the more established technology companies, former favourites with investors, took a nosedive. Sausage Software shed 31% to be worth \$3.06 a share, and not far behind was its merger partner Solution 6, which fell 27% to \$5.64.

ecorp also suffered in the market collapse. At the close of the day's trade, Kerry Packer

was 32% the poorer after his Net company slid from \$4.31 to \$2.95.

Even market darling MYOB saw its value fall to \$12.20, a far cry from the \$17 the accounting software stock was fetching the week before.

Some companies had the misfortune to make their stock market debut on that fateful Monday. IT recruitment company HiTech Group Australia opened at 5 cents below its 70 cent issue price, and online

**Continued on page 18**



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## NET BUSINESS

## To B2B or not to B2B

The business-to-business (B2B) ecommerce bandwagon is continuing to attract new companies, but some in the industry are beginning to question whether the much-hyped concept will really deliver profits.

The notion of B2B — where businesses buy products and services directly from each other online, cutting out distributors — has been eagerly embraced by many companies that haven't yet spotted opportunities in the business-to-consumer (B2C) market. Analysts are predicting massive growth in the sector, which they estimate will be worth \$US7.3 trillion worldwide by 2004.

Even the badly ravaged stock market (see opposite) has embraced the concept. B2B proved a winner with investors in April when B2B company Working Systems Solutions doubled its issue price on its stock market debut.

The company raised \$12 million through the issue of 16 million new and

8 million existing shares at 50 cents each. The public offer valued Working Systems at \$38 million. The company was worth double that when it commenced trading on the Australian Stock Exchange.

Online music retailer ChaosMusic has also thrown its hat into the trendy business-to-business ecommerce ring. Chaos believes B2B will deliver it \$2.7 million in revenue this calendar year, constituting 16% of its total income for the year.

Chief executive officer Rob Appel denied that ChaosMusic was bandying around the B2B buzz word simply to boost its flagging stock price. "This announcement is not about

the share price," Appel said. "It's about educating the market about what we do. We think the company is seriously undervalued."

Denying that music is primarily a consumer-oriented business, Appel said there are many companies that want to buy music in bulk, including schools, prisons, shopping centres and hospitals. ChaosMusic has established a B2B sales team to increase that revenue.

B2B may be all the rage at the moment, but not everyone is convinced. Online retailer dstore, for one, is sticking with its business-to-consumer focus.

LookSmart executive and dstore founder David Gold acknowledged the hype surrounding business-to-business

## B2B: How big is it?

1999

Australia

\$4.4 billion

2004

Australia

\$300 billion

Asia

\$1 trillion

Worldwide

\$7.3 trillion

ecommerce. "B2B is the big trendy word in the US at the moment," he said, noting that B2C was hot last year. "I think B2B, in terms of the volume of transactions and dollar amount attached to it, will be significantly higher than B2C," Gold said.

dstore has succeeded in attracting a number of high-profile partners for its business. Its investors include Rebel Sport, LookSmart and Tinshed, and it has an alliance with ninemsn. Former NSW premier Nick Greiner recently relinquished his seat on the Coles Myer board to assume the role of dstore chairperson.

**William Maher and  
Cosima Marriner**

## The crash we had to have

Continued from page 17

retailer bigshop.com.au closed its first day of trading 36% below its issue price of 25 cents.

Much of the loss was absorbed by the so-called new economy stocks, as solid, well-established companies stood their ground in the face of the enormous investor sell-off. Qantas only suffered a 2% drop to \$3.47, the Commonwealth Bank was 3% weaker at \$24.90, and even Telstra only fell 5% to \$7.12.

Media reports claimed that LibertyOne's ability to repay a \$17 million loan secured by its investment in china.com, and the amount of capital it would be able to raise from its Nasdaq IPO were now in doubt.

Chief executive officer Graham Bristow maintained that LibertyOne has enough cash reserves to last it another 12 months.

Local technology stocks recovered slowly from the

share market plunge, aided by solid gains on Nasdaq. However, they continued to remain volatile; one week later, although improved, many dot coms were still a long way off their pre-crash valuations.

Those hit hardest recovered fastest: Spike bounced back by 25% to be worth \$1.35, LibertyOne was 31% stronger at 59 cents and eisa spearheaded the renaissance, climbing 45% to \$1.35.

Not so lucky were the once-favoured blue-chip technology stocks. Four days on, Sausage had only regained 6% of its value to be \$3.23, ecorp was only 3% better off at \$3.05 and Solution 6 was just 2% ahead at \$5.75.

Despite the mild recovery, it will be some time before technology stocks reclaim the enormous valuations they once boasted — if they ever do.

**Cosima Marriner**

## SEND MESSAGES TO ANYONE

## SMS goes intercarrier

You might not be able to keep your existing phone number when you switch mobile phone carriers until March next year, but Australia's top three mobile carriers have proven they can cooperate if it suits their bottom line.

In April, rival telcos Telstra, Optus and Vodafone announced that customers using their GSM mobile services could send short message services (SMS) to anyone on any of the three networks. Previously, customers could only send messages to others on the same network or subscribe to a service such as SMSMeBaby, now known as BlueSkyFrog.com, which pro-

vides email-to-mobile and mobile-to-email messaging.

SMS is preferred by mobile users for communicating brief messages to fellow mobile users, because it is cheaper than making an actual mobile phone call.

Optus, for example, charges a flat rate of 20 cents per SMS communication. In comparison, a minimum 30-second phone call from an Optus mobile phone to a user on another carrier can range from 33 cents to 65 cents, depending on the selected mobile plan.

Inter-carrier SMS is expected to increase the number of messages users send to each other Australia-wide.

**Roulla Yiacoumi**



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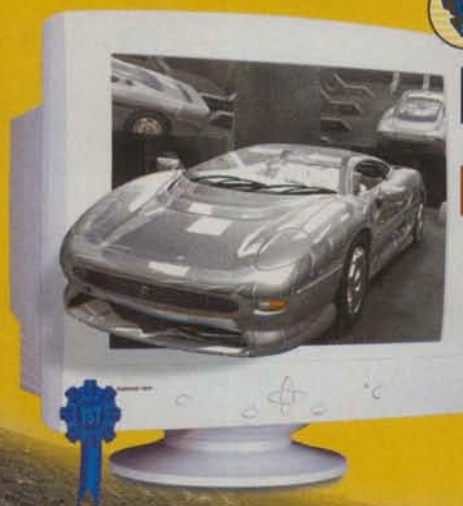


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## WORK EMAIL PRECEDENT SET

## Ansett loses email case

A recent court case has turned the spotlight on the issue of personal use of email at work.

In early April, the Australian Federal Court ruled that Ansett had acted illegally when it sacked an employee for sending union material through its email system. Maria Gencarelli sued Ansett after she was dismissed last December for contravening the airline's technology use policy.

Justice Ron Merkel found that Ansett was in breach of the 'freedom of association' provisions of the Workplace Relations Act, which protect the right of employees to distribute union information to colleagues.

According to Deacons Graham & James solicitor Leif Gamertsfelder, the crucial aspect of the ruling was that existing laws will always take precedence over the technology policies of any individual business.

"The judgement implicitly states if an employer wants to enforce a particular technology policy, they're within their rights to do whatever the policy states," he said. "Ansett was quite legitimately within their rights to have a technology policy — but the Workplace Relations Act supersedes any contractual rights Ansett has."

Gamertsfelder believes the message of the case is clear. "Where a specific law states quite clearly that employees



have the right to distribute information and it doesn't exclude the use of email to distribute information, then that law will prevail over any technology use policy a company has in place," he said.

To ensure employees are well aware of their rights in the information age, the Australian Privacy Commissioner recently released 'Guidelines on Workplace Email, Web Browsing and Privacy'. The guidelines recommend steps employers can take to ensure staff understand their policy on email use and Web browsing.

According to the guidelines, employers should ensure their email and Web use policy is clearly communicated to staff. In addition, the commissioner recommends that company policies are explicit about what is permitted and what is forbidden; what information is logged and who has access to it; and how the organisation intends to monitor and regulate staff compliance to the rules.

**Cosima Marriner**

## BANDWIDTH DEMAND TO INCREASE FIVEFOLD

## Bandwidth woes to continue

A major government report has found that while Australia has well-developed broadband data delivery capacities, and prices for wholesalers are likely to fall substantially over the next four years, consumer access to high-speed services will remain a major problem in both urban and rural areas.

IT minister Senator Richard Alston has released the final report of the National Bandwidth Inquiry, which has been examining the capacity of Australia's broadband networks. The year-long investigation has concluded that Australia has good backbone networks in place, but new approaches will be needed to ensure that consumers can access those services.

The report predicts that demand for bandwidth will increase fivefold between now and 2004. Already, international data links are strained to capacity, and this problem may well increase, the inquiry found. Continued competition will force down the price of wholesale bandwidth, allowing a greater diversity of services.

For consumers, the range of high-bandwidth options has increased considerably in recent months, as Optus and Telstra have both launched

unlimited cable Net access plans and a number of businesses are planning to launch ADSL services. However, access to these services is restricted to east coast capital cities, and even in those cities, availability has been limited.

The report opposes heavy subsidisation of bandwidth for rural users, arguing that this minimises the benefits of competition for consumers. Effectively, this appears to mean that rural people will continue to have limited high-bandwidth services and pay more for them.

Alston said he is pleased with the findings of the inquiry. "It has found there is likely to be adequate bandwidth in the backbone network on most routes to meet the majority of demand scenarios," he said. "The report gives a clear indication that the underlying infrastructure is capable of meeting the demands of the information economy."

Results of the inquiry have been delayed. The inquiry began in December 1998, amid claims of a possible bandwidth drought for Australia, and was supposed to report in October last year. It released a discussion paper last September, but then called for public comment for the final report.

**Angus Kidman**

## News Roundup

• Better late than never, retail chain Coles Myer has finally unveiled its ecommerce strategy. To consolidate its online businesses, Coles Myer has established a new company called — wait for it — e.colesmyer. It will comprise four divisions: e.trading (business-to-business services), e.tailing (online retailing), e.services (fulfilment, database management,

multimedia services and marketing) and business development. The company may consider floating e.colesmyer.

• Telstra plans to create a new IP backbone company, a regional mobile services group and a local content aggregation company as part of a multibillion dollar joint venture with Pacific Century CyberWorks (PCCW). Telstra has entered a strategic alliance with the Hong Kong telco and PCCW will issue Telstra

with a \$US1.5 billion convertible note as part of the deal. Upon full conversion, it would give Telstra a 20% stake in PCCW.

• Mobile phone carrier RSL Com has confirmed plans to enter the home Internet market in Australia. The newly reformed company, now operating under the name ComVergent Telecommunications, said dialup Internet access for residential customers will be available this month. Customers will be able to sign up for





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## THE MONEY MATERIALISES

## eisa inches towards OzEmail funding

**M**onths after it first outlined plans to buy out OzEmail (see APC April, page 24), Internet service provider eisa has managed to raise just \$180 million of the \$350 million required to fund the takeover.

The ISP has sealed a \$40 million deal with Fairfax's online arm f2, and has also announced two further investments from ANZ and Hastings Fund Management. ANZ has signed a memorandum of understanding for \$40 million in shares, and Hastings Fund Management has committed to plunging \$100 million into the enterprise. In early March, the National Australia Bank took a 7.81% stake in eisa.

eisa hopes to use the ANZ connection to promote a range of financial services, including the inevitable business-to-business services. Hastings' contribution is largely limited to cash.

However, just days after announcing the deals, eisa suffered its biggest loss ever on the Australian Stock Exchange (see 'The crash we had to have', page 17). The ISP was one of the hardest hit when the tech stock bubble burst. Investors wiped 56% from the value of eisa shares, sending them plummeting to 93 cents.

eisa chief executive officer Damien Brady assured investors that the capital raising required to fund eisa's purchase of the OzEmail dialup Internet access business will not be affected by the slump.

"Notwithstanding the decline in the market, eisa remains confident that with the benefit of its strategic investors and partners... it will conclude its current capital raising program within the time frame originally envisaged," Brady said.

A widely discussed deal between eisa and Disney's online arm, the Go Network, is still on the table. Reports have suggested that Disney will take up to 15% of the company in return for content rights in Asia, but details were yet too be finalised at the time of printing. A statement by eisa to the ASX said that the deal will only cover some of Go's properties, and that no definitive arrangement has been reached.

eisa is expected to look to the US for further investment funding, as well as continuing discussions locally with Vodafone and the Seven Network's online arm, i7. Representatives from each of the contributing companies are expected to take seats on eisa's board.

**Angus Kidman and Cosima Marriner**

## Cashbook: Better than expected

It's been a bumper quarter for most IT companies, and revenue and profits are on the increase. The best performers have been the well-established technology companies.

Leading the charge is Sun, which increased its revenue by 35% to rake in \$US4 billion for the first time. The solid result provided the basis for the networking company to double its profit to \$US436.2 million.

Apple put on a similarly good show. Continuing its renaissance of the past two years, Apple's profit soared 73% to \$US233 million.

Fellow PC maker Gateway posted a record profit of \$US136 million, despite its sales only increasing by 11% and its business division experiencing a sales slump of 19%.

Despite its DOJ woes, Microsoft recorded a revenue increase of 23%, notching up \$US2.39 billion in net income. Other members of the billion-dollar revenue club include data storage company EMC (\$US1.8 billion), Cabletron (\$US1.4 billion) and processor company AMD (\$US1 billion).

IBM fared the worst of all the established tech players. Its first quarter for the new century saw revenue decline by 5% from 1999 levels to

\$US19.3 billion. The company blamed Y2K for the poor showing, which included a 12% drop in hardware sales.

It is in the midst of transforming itself into an ebusiness company, but IBM might well wish it was a dot com like Yahoo, which boosted its revenue by 120% to \$US228 million during the quarter. The portal even managed to make a profit of \$US77.8 million.

However, this pales in comparison to AOL, which increased its net income by a whopping 161% to \$US271 million.

Locally, domain registration company

Melbourne IT recorded an incredible 565% increase in revenue, raking in \$11.3 million for the first quarter ending March 31.

But the world has not completely turned on its head — there are still Net businesses bleeding money. Online advertising agency DoubleClick lost \$US18.4 million, even though revenue grew 179% to \$110 million.

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## News Roundup

Internet access through ComVergent's DigiPlus and RSL Com divisions.

⊗ In other ISP news, filtered-content service Kidz.net has launched its own Internet service provider. The company has announced its National Family Net service, which is currently available in Sydney and will be rolled out nationally over the next year. The ISP service costs \$15 a month,

plus \$9.95 a month for the Kidz.net filtering service. There is no limit on connection hours, but a comparatively meager 300M download limit applies. In related Kidz.net news, Australia's Manoj Murugan, formerly of IBM, is heading overseas to take up the top job at the Kidz.net headquarters in London.

⊗ There has also been a major change of the baton over at Web developer Spike. Founder and CEO Chris O'Hanlon has

resigned, citing an unnamed medical condition. O'Hanlon will not be immediately replaced, as John McGuigan recently took on the day-to-day running of the company and Lawrence Maltz assumed responsibility for its Spike Radio division.

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Australians are being bombarded with ads for Web sites. Who's behind these crazy campaigns, and do they really work?

# Ads.com building the Internet brands

From the sides of buses to the ad breaks in *Ally McBeal*, Internet advertising is upon us. From 'Free free, FreeOnline' to 'I'm Jane Doe and this is my dot com', advertising for Australian Web sites has established itself as a significant occupier of commercial airtime.

The rush to advertise dot coms is just another part of the Internet boom that has been a money-spinner for investors, lawyers and now the big ad agencies. Dot com advertising is interesting for its creativity and tactics. It's all about creating brand awareness rather than selling a specific product, because Web startups are desperate to be noticed.

Naturally, it all started in the US. The most well-known and expensive place for US dot coms to advertise is on television during the Super Bowl (the NFL championship, watched by an estimated 125 million people), replacing regulars like Coca-Cola, Budweiser, Nike and Apple. Super Bowl advertising slots cost \$US2.1 million for 30 seconds, which is about \$US70,000 a second. According to *AdWeek*, dot coms accounted for up to 30% of US advertising companies' revenue in late 1999. One startup, Computer.com, spent \$US3 million on Super Bowl advertising before it sold its first product. *OurBeginning.com* did the same, even though it is said to have revenue forecasts of only \$US1 million for its first year.

The best ads have become collectibles on the Internet, in the form of RealVideo or QuickTime files. For example, online stockbroker E\*Trade's advertisement during this year's Super Bowl showed a chimpanzee dancing on a dustbin, while two geeky looking kids sat by it and smiled. Nothing else happened. At the end of the ad, the words on the screen read "Well, we just wasted \$2 million bucks. What are you going to do with your money?"

The dot com with one of the most celebrated ads is Outpost.com. Each ad features the company's boss calmly showing a video of the company's latest brand awareness tactic, such as tattooing 'outpost.com' on the foreheads of kindergarten kids, or releasing a pack of hungry wolves on an unsuspecting marching band. Viewers are invited to complain to Outpost.com. The company quickly went

from being an unknown to a household name.

Although some of these ads may eventually find their way onto Australian television, there is also a healthy local dot com ad industry. You may be familiar with the E-Loan advertisements, where a person is taken from one job and placed in another (a lawyer becomes a shearer, a brickie turns police negotiator). The slogan is "You don't get a home loan every day, but we do." This campaign was conceived by a 'virtual agency' of Net-savvy representatives from several Asia-Pacific advertising companies, brought together by E-Loan for the purpose. Those involved had connections with ad campaigns for Sold.com.au, Channel V and Drive.com.au.

"E-Loan is a very different mortgage broker and the advertising, by being very different, clearly reflects that," E-Loan's general manager of marketing Ian Whitehead said. "The E-Loan campaign is based upon a fundamental truth that getting a home loan isn't something you do every day. In each execution we show how inexperience can leave you feeling like a fish out of water."

The campaign was devised in Australia but is obviously descended from overseas dot com advertising. The unnerving laugh of the E-Loan manager as he walks away from the latest career transfer disaster is reminiscent of the Outpost.com sense of humour. The aim is to create a "fresh, irreverent personality" for the company, compared to other financial institutions, and if the brand name sticks, the ad is successful.

Telstra's 'my dot com' campaign was also devised in Australia by Mojo Partners, best known for the 'You oughtta be congratulated' margarine ads of years gone by. But there's no jingle here, just a bizarre autobiographical statement about using a Web site.

Another locally devised ad campaign is the 'dstore knows' series for the online department store. It was devised by Damian Pincus and Kate Hunter from Whybin Lawrence TWBA. They have



already shot a year's worth of advertising for dstore.

"In the States, rather than talking about convenience, they talk about a brand and create an overall feel and advocacy," Pincus said. He said this was also dstore's aim from the beginning. Pincus claimed research shows 50% brand awareness among local Internet users, ranking dstore with Amazon.com in their minds.

The campaign began just before Christmas last year, and the ads show a real-life sales assistant with a name badge saying "Hi, I'm USELESS", in an attempt to convince people of the convenience of finding goods online without queueing. Eleven ads were devised, each for a category of goods such as toys, health, music videos and DVDs. The TV campaign has since adopted the recurring slogan 'dstore knows', and Pincus said it will now expand to radio and print media. The original TV slots were selected for the slots that Whybin Lawrence predicted most Internet users are watching; during shows like *Ally McBeal* and *The Simpsons*.

Simon Vandore





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Internet venture capital has arrived in Australia — and fishing for it combines old-fashioned begging with a rock concert atmosphere.

## Angels of the VC boom

It may be six years too late for the brightest sparks of the local IT industry, but the new tax system and interest from old, big money like the Packer family have brought new opportunities to Australian startups.

In late March, hundreds of aspiring technology businesspeople paid up to \$1,000 a head for a two-day KickStart for Startups conference, held at Sydney's Star City casino and run by high-profile IT investment firm Tinshead.

The atmosphere was that of a rock concert — black T-shirts with flashy logos, single-strap backpacks, free massages and free copies of Sanity's *Sain Unlimited* music magazine — but the crowd was there to fish for cash from 'angels'.

The term 'business angel' once referred to generous businesspeople (often retirees) who voluntarily helped startups get out of trouble or backed underfunded theatrical productions, but more recently the term has been borrowed to describe venture capitalists.

Delegates queued to give one-minute pitches on stage to a group of local and imported venture capital experts such as J&W Seligman's managing director Storm Boswick, Newport Capital chief Charlie Zoi, and Macquarie Bank investment director Bill Bartee. The pitches were real, and the investors really were scouting for talent. Afterwards, this group of VC dealers offered critiques of the exuberant presentations and came up with a list of tactics for initial contact with their firms.

Bartee stressed that it is vital to begin a pitch by describing the problem your venture solves — plans, alliances and personnel can be mentioned later in the piece. Zoi said he wanted to know "what you make, how you sell it, who buys it, and how it will grow". He and several others on stage agreed that they only ever read the first two pages of most business plans, and the main reason they stop reading any further is repetition. Any business plan that keeps them reading beyond those introductory pages is more than likely to result in a phone call.

The worst way to begin a pitch to venture capitalists, the panel agreed, is by asking them to sign a non-disclosure agreement (NDA). Leading with an NDA

might seem prudent, but it only serves to widen the gap between the startup and the venture capitalist. Alternatives to NDAs include simply noting the date of the meeting in a diary (for future reference if intellectual property were to be threatened), and perhaps sending a friendly letter after the meeting to reinforce the fact that the discussions were in confidence.



Tinshead's chief technology officer Vivian Stewart concluded with a list of the vital elements of a pitch to venture capitalists: the business opportunity, the team, the product or service, how it will make money, who the customer is, what the market is, who the competitors are, what the milestones will be, how the business will scale, how much money the business needs, and what will be done with this money.

Stewart started Sydney ISP Magna Data in 1994 with Internet technical whiz Luke Carruthers (who is prominent on local Internet industry bodies) and partners. Despite chaotic billing practices, unhappy customers and a \$20,000 fine for software piracy, Magna Data eventu-

ally moved from a one-bedroom flat to city office space and became a major Web space provider (supplying Fairfax and other large companies). The company was sold to Davnet last year for between \$20 million and \$30 million, qualifying Stewart as an advisor to and selector of local Internet companies deserving capital injections.

Former prime minister Bob Hawke spoke about Australia's place in the Asia-Pacific region, and communications minister Senator Richard Alston spoke about government support for technology startups. CEO of the National Office for the Internet Economy (NOIE), Dr Paul Twomey, outlined the government policy changes that have led to a friendlier environment for local VC.

The new tax system is more than just the introduction of a GST; income tax and business tax rates will be lower, and capital gains tax (CGT) will be phased out. Indexation of capital gains was frozen on September 30 last year, and a gradual relaxation of CGT rules has followed, along with the first wave of CGT reductions.

CGT was seen by many as the major impediment to overseas investment in Australia's technology industry. Local expertise tends to head overseas instead of finding local backers, and US VC firms in particular regard Australia as unfriendly towards investors. Now that the disincentives are being removed, Stewart said that several large US venture capital firms have been making enquiries about investing in Australia.

Last year, according to the Australian Venture Capital Guide, the industry in Australia had 29 new entrants and 10 departures, contributing to a total capital of \$6 billion in the sector (across all fields). Venture capital, once almost non-existent in Australia's technology marketplace, has become a serious consideration. Everyone wants to be involved with a fledgling dot com and reap the rewards of listing on the stock exchange or being bought out (known as an 'exit' in VC terminology) rather than buying shares in more established Net businesses.

**Simon Vandore**



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# Netscape Navigator 6:

Where once it possessed the lion's share of the browser market, Netscape now runs a sorry second to Microsoft. But with the Mozilla project behind it, Netscape is attempting to use Communicator 6 to make a comeback. In light of the recent release of Navigator 6 Preview Release 1, **Andrew Colley** assesses Netscape's chances.

Almost as soon as Netscape Navigator 6 Preview Release 1 (PR 1) became available on the Netcenter portal, the Internet community was buzzing with disappointment. After the long wait for a successor to the aging series 4 browsers, anything less than dazzling was going to disappoint.

Netscape's marketing department should accept some responsibility for the public's reaction. Its publicity played down the fact that PR 1 is a beta version, and left most people with the impression that it was just a few tweaks away from being a final release. In reality, it is a buggy, late milestone release of the Mozilla browser with AOL branding and services built in. It's the kind of beta release that would usually be distributed among a sympathetic group of testers and developers, not the general public.

The Mozilla project was started in February 1998, before Netscape was bought by AOL. Inspired by Eric Raymond's seminal article on open source, 'The Cathedral and the Bazaar', Marc Andreessen, then executive vice-president, decided to open the browser's source code for further development.

The Mozilla project was given the task of developing the technology that would eventually be used for the branded commercial versions of Netscape Navigator and Communicator. It took two difficult years for the project to begin to produce usable releases, and it now distributes what are called 'milestone releases' every month or two. Navigator PR 1 is based on Milestone 14 of Mozilla. As APC went to press, Milestone 15 was being prepared for release. Netscape is planning to release PR 2 in July.

## What's new

The collective thumbs-down received by PR 1 to date isn't a fair reflection of the

achievements of the Mozilla project. Despite the fact that Navigator 6 has been constructed from an entirely new code base, the project has achieved several important objectives. It has managed to

300K download) and choose your components judiciously, you can reduce the download requirement to 5.5M (browser only). Netscape claims a typical installation will require about 11.5M.

## Before . . .



## . . . and after



Mozilla earns its first Netscape badge

build the most standards-compliant browser available, fill some large gaps in Navigator 4.7's feature set and significantly reduce the download size of the browser package. The download size of the full installation package is about 16.5M. If you use the online installer (a

Aside from its radically different look, the most obvious difference between the interface of Navigator 6 and previous versions of the browser is the addition of the sidebar. The sidebar is the cornerstone of Netscape/AOL's strategy for integrating branded online services and established communication tools such as AOL Instant Messenger (AIM) into the main browser interface.

Sidebar content is divided into tablets (or tabs) capable of holding Web content. The sidebar can be customised by adding and removing tabs to suit your needs, and gives content providers the opportunity to design and display their own tabs. Visitors to a site can be invited to add tabs to their personal sidebar by clicking a link.

The sidebar has also helped improve Navigator's search function. Unlike late versions of IE, the Navigator 4 series doesn't allow you to keep your search results in a separate view while inspecting the links in the main browser pane. Instead, you need to constantly open each link as a new window. With Navigator 6, you can view search results on a tier of the sidebar devoted to searching. The address field serves a dual purpose, accepting both URL and search input.

The default search protocol passes all input to an Internet keyword search, just as IE does. However, you can specify that you want your input handled as if it were being entered into the search tab's entry field by clicking the search button located at the end of the URL address bar.



# Phoenix or dead duck?

AIM is more integrated in this release of Navigator than in any of its predecessors. Rather than having to open a separate client to join the AIM network, it's available continuously on a tab on the sidebar, regardless of which application you're working in. The mail component of Navigator takes AIM integration a step further; if you receive an email from another AIM user, their email will display an additional icon indicating whether or not they are online. If they are, you can choose to communicate with them directly using AIM instead of composing an email.

Although mail and news are not functional in the preview release, the Composer component is working. It's an adequate but relatively basic WYSIWYG HTML editor. It doesn't support JavaScript or embedded objects other than images (you would have to import the code for non-image objects). However, it does produce code that is cleaner than several commercial packages, including FrontPage.

The translate function has been transferred from Mozilla, but it did not seem to work in the preview release. In Mozilla, you can translate an open Web page between various languages simply by selecting a menu item. We'll have to wait to see if this makes the cut in the release version of Navigator 6.

Netscape has gone beyond just providing a set of pre-packed bookmarks and has integrated several online services into the menu items and icons. Its Net2Phone service (which it charges for) is accessible from the *Tasks* menu, and a Calendar icon takes you to a page on Netscape's portal.

## Standards and more standards

One obvious problem with the new browser is its unattractive interface. This basic interface was a requirement set by the Mozilla project when it was developing the browser.

The Mozilla group's main goal is to comply as closely as possible with the standards laid down by World Wide Web Consortium (W3C). The W3C is responsible for providing the set of specifications that govern the Web and determine how Web

pages are rendered and transferred. Mozilla tried to make the final browser 100% compliant with the W3C's new technology standards for the DOM (Document Object Model) level 2, CSS (Cascading Style Sheets) level 2, RDF (Resource Description Framework), XML 1.0 and the XPCOM (cross-platform component) specifications, and so far it has done a good job.

Navigator 6 combines the use of these new technologies with an overall design philosophy to make the browser as modular and portable as possible. The interface is implemented in the XML-based interface language, XUL. XUL allows developers to write compatible cross-platform interfaces (or complete applications) for XML-compliant applications.

This makes the browser a development



A sample skin for Navigator 6

platform of sorts; the interface is simply an XML-compliant applet running on top of this platform and using the Gecko rendering engine on the back end. Similarly, the Gecko engine could be ported to an XPCOM and XML-compliant word processing application (if one existed). Extending that logic, the word processing application could be run in the browser window. It seems that laying the groundwork for developers to create their own front ends (or skins) for the browser has taken priority over designing an aesthetically appealing interface.

Like Winamp, users will be able to download or create their own interface design to fit better with the overall theme of their desktop. It's unclear at this stage whether AOL/Netscape will allow this on the commercial release of Navigator, but it will certainly be possible with Mozilla.

The Mozilla project has done well by complying with the W3C's standards, but this is a fairly meaningless achievement if the browser can't perform in the field. It did a better job of rendering APC's CSS and XML test pages than any other browser, but Web developers work in situations where they must ensure that their pages render correctly in the dominant browsers, meaning IE5 and older distributions of Navigator. Microsoft doesn't strictly adhere to the W3C standards, so it wasn't surprising to find that Navigator 6 rendered some page elements at some sites in interesting ways.

The other painful aspect of Navigator 6's performance was its Java capability (or incapability, as the case may be). Despite installing the version of Sun's Java virtual machine distributed with the program, and meticulously following the release note's instructions for Java-enabling the browser, it failed to work satisfactorily when it was tested on the Web. Applets either displayed incorrectly or failed altogether.

From APC's observations, Navigator 6 was slightly faster than IE5 at rendering pages. However, it seemed to become slower the more it was used. This has been a common complaint among Navigator 6 users; it may have a memory leak, which is not unusual in a prerelease product. The preview release of Navigator 6 is quite unstable and crashes frequently, but it does so without causing too much system disruption, and can be quickly restarted after a crash.

The Mozilla project has improved substantially on the old Navigator code base, but Navigator 6 PR 1 is far too crash-prone to be your browser of choice at this stage. Unless you are very curious, you should probably leave this beta version in the hands of technically savvy developers. However, if Netscape's XML gamble pays off, people will be beating a path to Netscape's door to get hold of the final release.

**Andrew Colley**

**Contact**  
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Netscape  
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A good attempt, but Navigator 6 is not yet ready for active duty.



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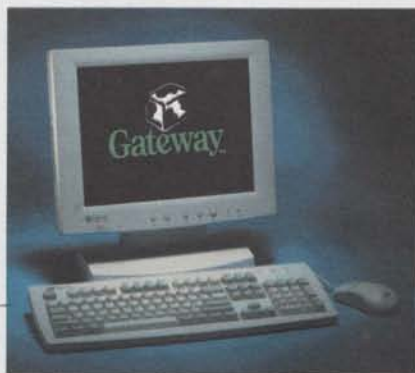


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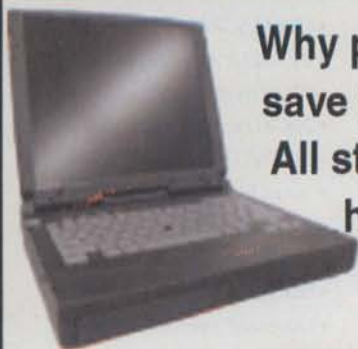
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## Gnutella

Forget what you know about file search engines, Gnutella has arrived. Written within AOL by the creators of Nullsoft Winamp (Nullsoft is now owned by AOL), the program existed for 24 hours before AOL removed it, but it was too late. Many copies had been downloaded by that time, and it has since been reverse engineered. An open source approach has now been taken to the software and you can download the latest versions (which are usually about 100K) free from the Web site.

Why was AOL so worried? Gnutella is tiny but extremely powerful, and it raised the ire of AOL because it is easy to use and can be used for trading illegal software. Gnutella is often compared to Napster, but there's an important difference. Napster is a tool for MP3 swapping (and is currently in legal troubles because of it), but Gnutella is not solely linked to MP3s and can be used for searching for any file types. ZIP files, documents, movies and other files can all be found using Gnutella. It comes with a default list of file extensions to search for (digital music is rather prominent), but you can easily configure this list to suit your needs.

In the version APC reviewed (0.56a), Gnutella worked anonymously. You never knew who you were downloading from, or who was uploading from you. With Napster, contacts and file information are centralised on servers, but not with Gnutella.

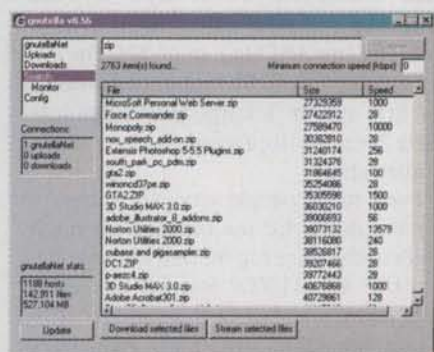
The authors claim Gnutella can withstand a direct nuclear attack, or even more destructive damage from a 'pack of lawyers', because of the decentralised setup of the 'GnutellaNet'. A good case in point is the recent collapse of the Napster servers due to ISP problems, which prevented users from using the program. This could never happen to the GnutellaNet.

To understand how this is all possible, you have to understand how Gnutella works. Think of Gnutella as less of a program and more of a file sharing protocol. However, there is no server to connect to, just other Gnutella users. Thus the 'GnutellaNet' is formed from a web of users around the globe. There's no monitoring servers or management structure, merely a vast peer-to-peer network. The amorphous network structure makes tracking activity hard, if not impossible. The number of users constantly fluctuates.

For instance, you could be searching for something like abc.txt but don't know where to find it. There are many Gnutella users, each with, say, four simultaneous connections to other users who also have four other connections. From your initial connection to a single user, your file search then spreads to that person's four connections and so on. Your search would spread from four to 16 to 64 to 256 to 1,024 users in a flash. Although Gnutella sets four connections as a default, you can easily increase this figure.

To find abc.txt, you connect with Gnutella to Bob. Bob is connected to Cheryl and Chris. Cheryl is connected to Dan and Daryl, and Chris is connected to David and Derek. And Derek has the abc.txt file. Within seconds your search checks all the drives and lists abc.txt for download. Downloads and uploads are not routed from Bob to Chris to Derek, but a direct link is made. It's the initial roundabout way of finding the files that makes it extremely hard, if not impossible to track the origin of the initial query. With power like that, it's no wonder that the recording industry is alarmed.

The applications for Gnutella are not necessarily nefarious. You can set up Gnutella as an interoffice file sharing net-



Yes, there is some very dodgy software available via Gnutella

work, bypassing your normal network protocols. This is great for centralising documents, installation directories or drivers and so on. Gnutella can also stream media files from the source, rather than downloading them to your hard drive, so you could also use Gnutella to set up a streaming MP3 machine on your network.

Gnutella is exceptionally easy to use. There's a lot of information within the interface, including a live monitoring feature that displays the keywords that people are searching for. Like most Net searches, half of the keywords are related to sex and the other half are about movies or music. The interesting thing is the rate at which the searches come through the GnutellaNet — quite often faster than you can read them. The program also keeps track of packets sent, received and dropped for each live connection, and shows live stats on the current GnutellaNet. This includes the number of hosts, total number of files shared and a size counter for the disk space of all the files. At the time of review, there were 3,577 users and half a million files totalling just under two terabytes. With time, GnutellaNet will grow and these figures will undoubtedly become astronomical.

**Darren Ellis**

**Contact**

**Online**

**Price**

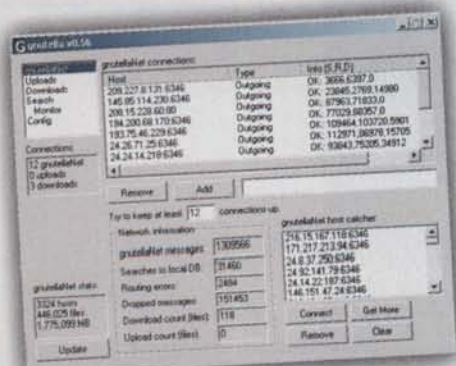
**In short**

Gnutella

<http://gnutella.wego.com/>

Free download

An amazing new way to share and stream files, but also a tool for piracy.



The connection screen. The figure in the bottom left reveals that there were 3,324 users connected to the Gnutella network at the time, sharing a total of about 1.7 terabytes of files.



# Dell Dimension XPS B1000r Special Edition

Last month, APC reviewed a 1GHz system for the first time. The machine reviewed was a Gateway Select 1000, featuring the new 1GHz AMD Athlon processor (see APC May, page 30). The Dell Dimension XPS B1000r Special Edition is the first system incorporating the Intel 1GHz Pentium III processor to be released in Australia.

Even those people who are happy to pay top dollar for the best system might balk at the price tag on Dell's latest offering, the XPS-B1000r Special Edition. It costs just over \$8,500; this is even more expensive than the Gateway 1GHz machine which costs \$7,621.

Dell has packed in all the latest goodies: a 30G hard disk drive, 19in monitor, 12x

133MHz, Intel might be pricing itself out of the market.

When you compare this system's benchmarks with those of the Gateway system APC reviewed last month, which had a 1GHz Athlon processor, most of the results follow the usual Athlon versus Pentium III trend. The 1GHz Pentium III beat the 1GHz Athlon in CPUmark 99, but the Athlon won the FPU WinMark 99, because Intel CPUs are better at integer calculations and AMD's strength is floating point. In office applications, the Dell machine is significantly more powerful than the Athlon-based Gateway machine we reviewed last month, beating it in Business Winstone 99 and SYSmark2000.

To go with the 1GHz processor and the motherboard's 4x AGP capabilities, Dell has chosen the beefiest graphics card it could find, an nVidia GeForce 256 Plus, with 64M of double data rate (DDR) SDRAM onboard. Not surprisingly, this combination produced results well beyond anything APC has ever seen. The Dell achieved 82.5fps in Quake III Arena at 1,024 by 768. Its scores in 3D tests such as 3DMark 2000 and Viewperf were up to 20% higher than those of the Gateway system APC reviewed last month. Admittedly, the Gateway's motherboard only supported 2x AGP, and its graphics card had half as much memory.

Curiously, the Dell system did not perform so well in 2D graphics tests, achieving similar scores to some of the 800MHz systems we tested in April (see APC April, page 88). Let's face it: with a system this fast, nobody's going to be waiting for their screen to redraw.

Josh Mehlman



DVD-ROM drive, 8x CD-RW drive, Creative Labs Sound Blaster Live soundcard and Altec Lansing speakers.

What makes this system so expensive, apart from the processor, is Intel's new 820 chipset. The 820 has a 133MHz system bus, uses Rambus RDRAM instead of SDRAM and has a 4x AGP slot, doubling the graphics card's potential bandwidth. The Rambus memory has clear performance benefits, but it also jacks up the price. RDRAM currently costs up to \$1,000 for 128M; over four times the price of PC133 SDRAM, which has comparable performance.

When Intel originally released details of the 820 chipset, there was concern that RDRAM would be too expensive for consumer applications (see APC August 1999, page 85). So far, those fears are justified. The price will come down in time, but it will be a long time, if ever, before RDRAM is price competitive with SDRAM. And as manufacturers like Via are producing PC133 SDRAM chipsets, which can also run the bus at

<b>Product</b>	Dimension XPS B1000r
<b>Contact</b>	Dell
<b>Phone</b>	1800 812 393
<b>Online</b>	<a href="http://www.dell.com.au/">http://www.dell.com.au/</a>
<b>Price</b>	\$8,518
<b>Warranty</b>	3 years RTB
<b>Specifications</b>	
<b>Processor</b>	1GHz Intel Pentium III
<b>Secondary cache</b>	256K
<b>RAM and type (maximum)</b>	256M RDRAM (512M max)
<b>Hard disk</b>	30G Ultra ATA/66
<b>Hard disk controller</b>	Intel 82801AA bus master IDE controller
<b>Hard disk file system</b>	FAT32
<b>Graphics card</b>	nVidia GeForce 256 Plus
<b>Video bus type</b>	4x AGP
<b>Video RAM</b>	64M
<b>Video controller chip</b>	nVidia GeForce
<b>Graphics driver name and version</b>	NVDISP 4.12.01.0377
<b>Monitor</b>	19in Dell
<b>Tested resolution /colour depth/refresh rate</b>	1,024 by 768/16 bit
<b>CD/DVD-ROM drive</b>	8x Sony CD-RW, 12x (max) DVD-ROM
<b>Soundcard</b>	Creative Labs Sound Blaster Live
<b>Speakers</b>	Altec Lansing ADA885
<b>Modem</b>	Conexant Internal V.90
<b>OS available</b>	Windows 98, NT 4.0
<b>Bundled software and accessories</b>	Microsoft Works, Norton AntiVirus 2000
<b>Results</b>	
<b>Business Graphics WinMark</b>	354.7
<b>High-End Graphics WinMark</b>	1,004.30
<b>Business Disk WinMark</b>	6,240
<b>High-End Disk WinMark</b>	20,966.70
<b>CPUmark 99</b>	84.5
<b>FPU WinMark 99</b>	5,263.30
<b>Business Winstone 99</b>	34.1
<b>3DMark 2000</b>	4,806
<b>Viewperf AWADVS</b>	79.5
<b>Viewperf DRV</b>	32.6
<b>Viewperf DX</b>	43.4
<b>Viewperf Light</b>	4.2
<b>Viewperf ProCDRS</b>	Did not run
<b>Quake III Arena 640 by 480 at 16 bit</b>	112.4
<b>Quake III Arena 1,024 by 768 at 16 bit</b>	82.5
<b>Quake III Arena 1,600 by 1,200 at 32 bit</b>	Resolution not supported
<b>TreeMark simple (fps)</b>	48.4
<b>TreeMark complex (fps)</b>	12.6
<b>SYSmark 2000</b>	195





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# Caldera OpenLinux eDesktop 2.4

With the increasing focus on Net-based applications, Caldera has spotted an opportunity to provide an inexpensive, focused operating system. Its new Linux distribution, eDesktop 2.4 is targeted specifically at a market it calls the "Internet desktop"; businesses that have little need for anything other than a Web browser and simple office applications.

According to the marketing material, this product is designed to provide all you need to have an Internet connection up and running, and comes with email, Web browsing and productivity applications. However, this distribution is not much different from others currently on the market.

It's more polished than most, but it's still Linux and it's still difficult to use. It now has better hardware detection, features like automounting, and a much improved configuration tool, but the rough edges and sometimes inconsistent interface make it a poor choice for an everyday desktop system. This product is not for those who get jittery at the thought of a command-line interface or have no idea what hard disk partitioning is about.

Its main selling point is that it sets up the key Internet packages automatically. Netscape 4.72 is there, of course, but it also preconfigures Macromedia Flash Player 4.0, Real Player 5.0 and Acrobat 4.0. It sets up news, FTP and email automatically with knews, NCFTP and kmail respectively. Instant messaging is taken care of with ICQ and Netscape Messenger. It also includes a wizard-style interface for setting up a dialup connection to the Net. A basic desktop installation will give you all you need to make use of the Net's most important applications.

In addition, all of the usual Linux extras are there if you want them, including numerous servers and esoterica. Apache, Samba, Majordomo and OpenL-

DAP are all thrown into the package. One very clever inclusion is the ICA client, which allows connection to a MetaFrame server for running Windows applications remotely, making it a very good choice of platform as a client for application service provision (ASP), for instance.

One of the best features of the package is that it can install from Windows. Insert the CD, it autoruns, then click on install. The distribution will take care of the rest — assuming the partition situation is to its liking. Owners of the registered version of OpenLinux get a customised copy of Partition Magic to set up the hard disk.

If you don't have Windows, you can install from the bootable CD or a floppy. Whichever way you decide to install, the process is generally straightforward. It guides you through the configuration options. It detects most hardware, allows you to set up video and location settings, and then allows you to play Pac-Man while you're waiting for the packages to finish installing. Power users should note that eDesktop does not allow you to easily specify individual packages: Caldera almost forces you to accept one of its predetermined package configurations (such as business desktop or workstation).

After installation, the OS is quite well put together, and it has intelligently configured menus and desktop options. It uses the K Desktop Environment (KDE) exclusively.

System configuration is performed using COAS (Caldera Open Administration System), which may not cover as much ground as some configuration tools, but is easier to use than most. COAS is swallowed now by the KDE Control Centre, from which a broader range of configuration options can be set. The best way of configuring the system, however, is through the new Webmin package. Webmin allows you to manage processes, hardware, cron jobs, packages and servers using a Web browser, either locally or remotely. It's handy, but doesn't make the administration of the system any easier — you still have to know what you're doing.

One serious shortfall of the distribution is that Caldera has yet to integrate an automated package update tool. Corel and Red Hat both have software that will go out and search for updated versions of packages on the system, and allow you to update those packages simply by checking a box.

The performance of the system also leaves a little to be desired. On a 300MHz



The new Webmin tool makes administration easier

Pentium II with 256M of RAM, it still managed to churn and skip quite a bit; a Red Hat installation on the same system ran very smoothly. This seems to have less to do with the Kernel used (eDesktop uses 2.2.14) than with KDE.

Buyers of the registered version get a few bonuses, the most notable of which is the inclusion of Partition Magic on the install CD. There's also Omnis Studio 2.4 (a rapid application development environment), MoneyDance (a simple personal finance package) and the office suites StarOffice 5.1a and ApplixWare. These have to be installed separately from the main install process, using a CD which autoruns and guides you through a simple setup process.

The manual provided with the boxed version of the product is excellent, and the help systems are easy to access and very useful. When you scroll over a menu icon, it gives a proper description of the product (so although the software name might be nonsensical, the description will tell you what it is). There is also a personalised user menu listing recently used applications and a link to the home directory of the user.

In terms of elegance and features, Red Hat still has the advantage over Caldera, but like Corel, a greater similarity between Windows and eDesktop means that many new users may be tempted to go for the Caldera option.

**Nathan Taylor**

**Contact**  
**Phone**  
**Online**

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# Fishpc

When the Fishpc turned up at APC, several writers were bemused: some hated it on sight, and some thought it was incredibly cool. It's certainly a far cry from the boring beige box, and it is definitely an iMac-style machine — everything is USB, clear plastic, and not particularly upgradable. It's not expensive at \$1,999, but even at that price, it fails to deliver.

Even if you like the fishy style of the case and speakers, there are a few design problems. The keyboard is very small, and difficult to type on. The front-mounted CD drive has an annoying catch that tends to flip the CD cover up into your hand. And the cute speakers deliver mediocre sound.



The results achieved by the Fishpc in APC's tests are also decidedly average. It's unlikely that you would consider this machine for business use, as its Ziff-Davis Business Winstone score of 15.3 is much lower than expected for an entry-level 450MHz PC. Similarly, it scored poorly in the Ziff-Davis High-End and Business Disk WinMarks, High-End Graphics WinMark and SYSmark2000 tests. This doesn't bode well for its future as a home PC, no matter how much you might appreciate its aesthetics.

The Fishpc is also technically under-equipped. It has a graphics chip built into the motherboard, but that uses 4M of the system's main memory, effectively reducing it to 60M. In the short term 60M is acceptable, but as the Fishpc has only one DIMM slot, you will have to buy fairly large, individual DIMMs if you want to improve the system.

Sound is adequate but unexciting and, like the graphics, is performed by an onboard chip. The system comes with five USB ports, but you'll almost always be taking up the front two with the

floppy drive (which only worked in a very sporadic fashion) and the aforementioned keyboard.

The only practical application for the Fishpc is in trendy Internet cafes, where a lack of storage space and poor graphics performance don't really matter. It would certainly get the customers talking.

Even a year ago, a system at this price might have been something to look at favourably. Now, when \$2,000 systems pack in so much more, the Fishpc is an also-ran. The Fishpc Web site tells visitors that "you got to have it." APC begs to differ.

Alex Kidman

## Product

### Contact

### Phone

### Online

### Price

## Specifications

### Processor

### Secondary cache

### Tested/maximum RAM and type

### Hard disk

### Hard disk controller

### Hard disk file system

### Graphics card

### Video bus type

### Video RAM

### Video controller chip

### Graphics driver name

### and version

### Monitor

### Tested resolution/colour

### depth/refresh rate

### CD/DVD-ROM drive

### Soundcard

### Speakers

### Modem

### OS available

### Warranty

### Bundled software and accessories

## Results

### Business Graphics WinMark

### High-End Graphics WinMark

### Business Disk WinMark

### High-End Disk WinMark

### CPUmark 99

### FPU WinMark 99

### Business Winstone 99

### 3DMark2000

### Viewperf AWADVS

### Viewperf DRV

### Viewperf DX

### Viewperf Light

### Viewperf ProCDRS

### Quake III Arena 640 by 480 at 16 bit

### Quake III Arena 1,024 by 768 at 16 bit

### Quake III Arena 1,600 by 1,200 at 32 bit

### TreeMark simple (fps)

### TreeMark complex (fps)

### SYSmark2000

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### http://www.fishpc.com.au/

### \$1,999

### 450MHz AMD K6-3

### 256K

### 64M SDRAM (256M max)

### 8.4G

### Ultra DMA

### FAT32

### SIS 530

### AGP

### 4M shared with main memory

### Integrated SIS 3D

### sis530.drv

### 15in SVGA

### 1,024 by 768/16 bit

### 24x CD-ROM

### SIS PCI Audio

### Yes

### AMR V.90 voice modem

### Windows 98

### 3 years RTB

### StarOffice

### 92.3

### 358.30

### 2,270

### 5,966.00

### 21.5

### 1,426.00

### 15.2

### Unable to complete

### Unable to complete

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### Unable to complete

### Unable to complete

### 52

The products used in these tests are shipping versions available to the public at the time of publication unless otherwise stated. Winstone, WinBench and associated products are registered trademarks of the Ziff-Davis Publishing Company. These tests were performed without independent verification by Ziff-Davis and Ziff-Davis makes no representations as to the results. Note: The lack of an OpenGL driver prevented the Fishpc from running many tests.



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RDSH-8 8-port 10/100Mb Dual Speed Hub  
DSS-5+ 5-port 10/100Mb Dual Speed Switch

## Network Cables

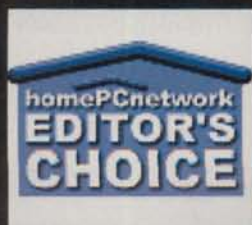
DC-10C5U 1 Mtr Cat-5 UTP Cable  
DC-30C5U 3 Mtr Cat-5 UTP Cable  
DC-50C5U 5 Mtr Cat-5 UTP Cable  
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DSB-H3SP 3-port USB Hub with 1 x Parallel and  
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# Dell Inspiron 3800 and Gateway Solo 2150

It seems that black is no longer the 'in' colour for notebook design. In an effort to stay at the cutting edge, both Gateway and Dell have released notebooks that come in wacky colours; the Gateway Solo 2150 in silver, and the Dell Inspiron 3800 in green, grey, blue or maroon. Both notebooks are aimed at the power user, and each features Intel's SpeedStep processor. Aesthetics aside, the two notebooks produced similar results.

Each notebook had its high and low points. The Gateway Solo 2150 processor is a big advantage, and you can reasonably expect that a Dell machine with similar specifications will be available by the time you read this. The Dell's strongest features are its larger hard drive (6G larger than the Gateway's 12G) and its higher memory base and capacity (128M on the notebook we tested).

The results for the two systems were neck and neck. The Solo's 700MHz processor clearly allowed it to overcome its comparative storage and memory shortages, and in doing so it edged ahead in several processor-intensive tasks. It outpaced the Dell in the Ziff-Davis CPUMark 99 by a clear two points, and achieved the highest result of any notebook APC has ever tested. Similar results could be seen for the FPU WinMark. The Dell had a clear victory in the Business Disk WinMark score, only to lag slightly for High-End Disk WinMark. Graphics WinMark scores were good, and again, the Dell topped the Business test and Gateway the High-End test. The Dell had a slight edge in the Business Winstone scores.

Both notebooks have SpeedStep processors, but we had difficulty testing the effect this feature has on battery life. The Gateway refused to run our battery tests, and we were only able to run the tests at the full-speed setting on the Dell, which managed just under four hours — a healthy hour above the manufacturer's claimed battery life. Overall, these results

show that both are quite good notebooks. However, the Dell is better for business applications, and the Gateway for higher-end applications.

Both systems have very similar multimedia specifications — DVD drives and internal modems — and even the same model graphics adaptor. However, the Gateway aced the high-end graphics categories despite the Dell's extra 4M on its graphics chip.

If you must have the speediest system, the Gateway has a slight advantage, and is



Dell Inspiron 3800

slightly cheaper. The Dell, on the other hand, comes in a variety of colours, has more memory and a larger hard drive for its extra \$156 price tag. As it is harder to upgrade notebooks than desktops, the extra power of the Dell for the extra price is a strong temptation. On that basis, it is better than the Gateway, but only just.

Alex Kidman

Products	Dell Inspiron 3800	Gateway Solo 2150
Contact	Dell	Gateway
Phone	1800 812 393	1800 500 338
Online	<a href="http://www.dell.com.au/">http://www.dell.com.au/</a>	<a href="http://www.au.gateway.com/">http://www.au.gateway.com/</a>
Price	\$6,054	\$5,898
Warranty	1 year RTB	1 year RTB
<b>Specifications</b>		
Processor	Intel SpeedStep 500/650MHz	Intel SpeedStep 500/700MHz
Secondary cache	256K	256K
RAM and type (maximum)	128M SDRAM (512M max)	96M SDRAM (288M max)
Hard disk drive	18G	12G
Video bus type	AGP	AGP
Video RAM	8M	4M
Video controller chip	ATI Mach 64 Rage Mobility	ATI Mach 64 Rage Mobility
Pointer device	Trackpad	Trackpad
Dimensions (h by w by d, cm)	4.5 by 31.9 by 25.25	4.38 by 31.2 by 25.8
Bare minimum weight	2.9kg	2.7kg
PC Card slot type	Two Type II or one Type III	Two Type II or one Type III
CD-ROM drive/DVD	6x DVD-ROM	4x DVD-ROM
Soundcard	ESS Maestro Sound	Creative EV1938 16 bit Sound
Internal modem	56K V.90 Modem	Actiontec 56K Modem
Display	14.1in TFT	14.1in TFT
Maximum internal resolution	1,024 by 768	1,024 by 768
Battery type and rated life	Lithium ion, 3 hours	Lithium ion, not available
<b>Results</b>		
CPUMark 99/FPU WinMark	59.6/3,475	61.9/3,735
Business Disk WinMark 99	3,226	2,550
High-End Disk WinMark 99	8,526	8,767
Business Graphics WinMark 99	174.3	139
High-End Graphics WinMark 99	492	500
Business Winstone 99	25.3	25
BatteryMark	3:58	Did not complete

The products used in these tests are shipping versions available to the public at the time of publication unless otherwise stated. Winstone, WinBench and associated products are registered trademarks of the Ziff-Davis Publishing Company. These tests were performed without independent verification by Ziff-Davis and Ziff-Davis makes no representations as to the results.



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# Hewlett-Packard Jornada 545 Pocket PC

**H**ewlett-Packard's Jornada 545 handheld device is the first in Australia to use Microsoft's new Pocket PC (a revamp of Windows CE) operating system. With the new Jornada 545, Hewlett-Packard has moved to an executive look. No more chunky plastic flips and big Game Boy-style buttons. It has now opted for a muted and round-edged, charcoal unit with oval buttons that bears a striking similarity to the Palm IIIc.

The flip-up lid hides a neat stylus. When opened, it reveals a very impressive 64,000-colour touchscreen with 240 by 320 pixel resolution, and a set of four application buttons and a power switch on the bottom of the unit. These buttons send you directly into Home, Contacts, Calendar and Tasks applications. There is no note-taker button, but the new Pocket PC includes Pocket Word. The controls are minimal, but very well thought out. A single button on the left-hand side acts as the voice recorder control, and above it a thumbwheel/press button that controls scrolling and select-

ing. The top of the 545 contains an IrDA window, a Type I CompactFlash (CF) slot and a headphone-out socket. The latter, in conjunction with the built-in MP3 and Audible Players, is capable of decent stereo, which means the Jornada can double as a handy entertainment device. If only the CF slot was Type II so the IBM Microdrive could fit into it.

Other features include a new menu interface that allows tasks to be closed to avoid processor overload, and a brand new Transcriber handwriting recognition system. Transcriber is excellent and quite fast (apart from you having to wait until a sentence is finished before translating).

A 133MHz Hitachi chip drives 16M of RAM. Connections to the host are either USB via a HotSync cradle, or serial via a direct connection. The unit's non-removable Li-Ion batteries charge while in the cradle and last for about eight hours.

The 545 comes with a very generous collection of software: Word, Excel, IE, Outlook, AvantGo, Money, Audible and Media Players, OmniSolve calculator, PeaceMaker



(Palm IrDA-compatible beaming), Book Reader, Image viewer, Golf, Solitaire and Pocket TV for MPEG-1 playback.

The Jornada 545 is definitely a step in the right direction, but the OS needs to be easier to use and the battery life still needs to be longer.

**Jeremy Torr**

**Contact**  
**Phone**  
**Online**  
**Price**  
**In short**

Hewlett-Packard  
13 13 47  
<http://www.hp.com/>  
\$999  
A good yet expensive Pocket PC handheld, but still not as good as a Palm.

# IBM Microdrive 340M

**I**BM has been playing the whispering game with the Microdrive for about two years now. Samples of a miniature, CompactFlash-size hard disk drive that could store up to 170M of data on a 1in platter were secretively passed around to a privileged few. It is finally here, and it's been expanded to 340M.

The Microdrive can store nearly 1,000 X VGA digital images or over five hours of continuous high-quality MP3 music, all in a sliver of alloy and plastic measuring a mere 40mm by 35mm by 5mm. There's no chance of lost data, or at least no more chance than with any other hard disk drive. In terms of storage capacity and speed, IBM claims a sustained data transfer rate of up to 3Mbps, which is very impressive.

The Microdrive comes in a 5mm-thick Type II CompactFlash format, and is therefore unlikely to be suitable for early-model digital cameras and PDAs, but it will work in most current products.

The big question mark over the Microdrive is not its capacity, but its power consumption. As a rotating mechanical device, it draws more power than flash memory storage cards. APC tested the device in a Canon PowerShot Pro70 digital camera and a Casio E-100 handheld device.

Neither device had any problems immediately locating and identifying the Microdrive. In notebooks, the drive slips into a special adaptor sleeve, which then plugs into any spare PC Card slot. Bundled Windows 95 and Windows 98 drivers need to be loaded before standard notebooks will recognise and read the Microdrive. Access times seemed to be no slower than with flash memory cards. Transferring 11M of JPEG images took about the same time (11 seconds) for both the Microdrive and a CompactFlash card.

The power drain was hard to pinpoint, but IBM gives 500mA as the maximum working current. This unquestionably

flattens batteries faster than flash memory, and was an estimated one-third faster at draining the batteries in the camera. The other side effect is heat. IBM warns that using the disk repeatedly makes it become hot to touch. However, it caused no problems in our test hosts. As an alternative to flash memory, it is a bargain in the dollar per megabyte stakes.

**Jeremy Torr**

**Contact**  
**Phone**  
**Online**  
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IBM  
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## Sleeping satellites

Your article on cable Internet access (see APC April, page 30) was informative, but what about the alternatives to cable Internet services?

I understand that pay TV providers that operate microwave and satellite transmission services are currently rolling out Internet access services that also promise to be significantly faster than 56K modem connections. The installation and setup will apparently be cheaper and easier, as the

*reviewed in APC's April 1999 issue. It has fast download speeds, but uploads and page requests are still via analog modem, meaning long lag times (which prevents online gaming, for instance). The most compelling competitor to cable is DSL, which a number of companies have announced, but we have yet to see implemented. DSL uses twisted-pair lines from local exchanges and has bandwidth comparable to cable.*

*As for the set-top boxes, check out our review, 'Hook, line and browser' on page 112.*

## Honey to the BeOS

You are probably aware of this, but I urge you to download and try BeOS 5 from <http://free.be.com/>.

Gary McGhee  
Internet

*Ed note: APC will have BeOS, Red Hat 6.2 and OS/2 Warp 4 on the cover CD of its July issue, along with a booklet explaining how to install and use each of these operating systems.*

## Business EFT behind

I am concerned about the current hopeless state of EFT payment transfers between businesses in Australia.

Currently, while we can easily transfer EFT payment details to our banks, the entry that appears on the nominated bank account often means that the recipient has to manually telephone the payer to identify the purpose, or the payment elements. A workaround is usually to insist that a fax be sent from the business making the payment, once again, so that the manual identification of the payment can be made easier.

This problem is experienced by just about every medium to large business using EFT payment in Australia. The notion of businesses happily making EFT transfers to each other and then creating a supporting structure of confirming faxes to allow for the manual allocation of the received payments seems absurd, and we should have left it behind a long time ago. Yet our banks seem to be offering little assistance. The BPay people say that their system is for consumers,

## THREADS

from APC's Web sites

APC struck a nerve with the review of cable broadband in the April issue. In addition to receiving numerous letters about it, our online message boards are chock full of posts about the topic, from the 'I'm bitter because I can't get cable' crowd to the 'I've got cable and it rocks my world' posters. One reader, James, a Big Pond Advance user, was one of the latter:

Even if the connection was capped at 256Kbps, I'm still getting a great deal. I used to be able to download just under 20M an hour, and now I'm looking at about 200M. I think Telstra has finally done something right, especially considering the fact that nearly anyone can get it. If you can get it, I recommend that you ring now. It's fast, cheap and you can use the phone while you're on the Net.

One anonymous poster had an extended rant about the problems of cable. Here is a sample:

TCP. No, this is not the Internet protocol, but rather Telstra's Crap Ping. Why do I say that? Simply because Freedom plan subscribers have been limited to a lame 400Kbps download.

'Why don't you go Optus then?', you may ask. Like many others, I would have — if they offered it in my area. When they do, I won't hesitate.

As for our review, one reader thought APC was a tad too harsh on Telstra, yet he considered our criticism of Optus to be fair. Wilfred Kazoks wrote:

I thought you were too negative about the Telstra service. You came across as trying hard to be perceived



services will use a standard modem and phone line to connect to your provider. All that will have to be installed at the user's end is an antenna and a card in the computer (a technician will do this as part of the installation procedure).

Also, how do the current TV/black box Internet setups being promoted by retailer Harvey Norman compare? I would be interested in your views and any information you may have on such services.

Peter Wills  
Internet

*Ed note: Such satellite services are already in operation. For instance, the Satnet service was*



without bias. The Optus service sounded genuinely unacceptable. However, the Telstra service, of which I am a recent subscriber, is not too bad. I really didn't think I could live with 100M a month, so I'm glad about the increase to 250M a month. I don't download a great deal, so this is OK. Sure I'd like more, who wouldn't? . . . I think you may have done a disservice to users like me who will be as happy as a pig in muck.

Want to put across your view, or see what other readers have to say? Join the discussion at <http://apcmag.com/interactive/> and <http://newswire.com.au/sboard/>.

## Correction

APC would like to apologise to readers and AAPT for an error that occurred in the ISP reviews in the April issue of APC. Due to a data-entry error, OzEmail's POPs were repeated for AAPT Smartchat Internet. The correct POPs for AAPT Smartchat Internet are listed below.

Additionally, we noted that AAPT refused to work under our HTTP testing software. However, surfing the Web on an AAPT dialup connection worked under normal conditions. ACT: Canberra

NSW: Sydney, Albury, Armidale, Bathurst, Bega, Campbelltown, Camden, Coffs Harbour, Dubbo, Gosford, Grafton, Lismore, Mulgoa, Newcastle, Nowra, Orange, Penrith, Port Macquarie, Richmond, Tamworth, Taree, Wagga Wagga, Windsor, Wisemans Ferry, Wollongong

NT: Darwin

Qld: Brisbane, Bundaberg, Cairns, Gladstone, Gold Coast, Mackay, Maroochydore, Maryborough, Mt Isa, Rockhampton, Toowoomba, Townsville

SA: Adelaide, Gawler, Mt Gambier, Port Augusta

Tas: Hobart, Launceston

Vic: Melbourne, Bacchus Marsh, Ballarat, Bendigo, Balliang, Cranbourne, Dandenong, Emerald, Geelong, Gisborne, Healesville, Kilmore, Kinglake, Lara, Mornington, Pakenham, Romsey, Shepparton, Nunawading, Warnambool

WA: Perth, Broome, Bunbury, Geraldton, Kalgoorlie, Katanning, Rockingham

although a business version may be set up in the future.

Surely the current arrangement is a major impediment to electronic business-to-business commerce?

Phillip Sheeley  
Charlestown, NSW

## Free Net access not so sweet

I thought the ISP reviews in the April issue (see APC April, page 106) were excellent, and I just have one thing to add concerning free Internet access. I joined up with GlobalFreeway, believing I'd save plenty of money. Well, I installed the software from the CD the company sent me, but it didn't work. After at least 20 minutes on the phone to the helpdesk (at \$2.50 a minute), I still don't have Internet access.

I gave up and signed up with DIALix instead. The staff were extremely friendly and helpful, but I still could not connect to the Net. They looked into possible reasons for this, and the conclusion was that the GlobalFreeway software I installed 'fried' my dialup networking, making it impossible to connect to anyone but GlobalFreeway. I have been advised to reinstall Windows 98 and to take the matter further with the ISP. I advise anyone thinking of signing up with GlobalFreeway to be very wary.

Rob Turnbull  
Internet

## Waiting for cable

Having found out that my residence was unable to obtain Optus' cable for its Optus @Home cable Internet service, I was overjoyed when news of Big Pond's price cuts arrived. Bursting with enthusiasm, I signed up online at the Big Pond Advance Web site almost as soon as the service was launched, and was looking forward to experiencing the unlimited 'Freedom' (as its plan is called) that a high-bandwidth Internet connection provides. I expected to have the service installed and running within a week or so, but to my dismay, it has been two weeks and I haven't even received so much as a confirmation that my online application has been safely received. My attempts at correspondence with Telstra on the matter prompted responses ranging from form apologies about delays to no reply at all.

In its media releases, Telstra complains about the cable market becoming much

more competitive — with all of one competitor, Optus — and here we are, the customers, waiting impatiently in line, money in hand and it doesn't seem to care in the slightest.

Turn it up Telstra!  
Ed Siu  
Internet

## At least there's one satisfied customer

I had a dialup connection for over two years before deciding to connect to Big Pond Advance with the new 400Kbps Freedom plan. I cannot recommend it highly enough. I was paying \$42 a month for 80 hours dialup access and \$25 to \$30 a month for a dedicated Internet phone line, including calls. My flatmate was also paying about \$25 a month with access and calls.

To get the cable set up, we paid a \$99 connection fee, and pay \$75 a month (for two users). We run the modem directly into a cheap four-port



hub to share the connection. My ping speeds have dropped substantially, especially to the game servers I sometimes use to play online games; download speeds have increased from an average of 5Kbps to about 45 to 50Kbps. I can now send and receive large emails without waiting for ages. There is no need to keep track of downloads or hours online.

There is no going back to dialup for me. Once I took into account phone call costs, it was easy to justify: 10 times the performance for the same cost. I now have to be more careful about online security, but a local firewall app (Norton Internet Security 2000) takes care of that for me.

In my opinion, it is worth every cent to go cable.

Name withheld  
Internet



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Angus Kidman

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The Internet is not going to kill TV, but TV itself may be more moribund than we thought.

## We still like to watch, sometimes

If you believe the prevailing wisdom, TV stations are scared of the Internet. By providing real time access to data, the Net threatens to usurp much of conventional broadcasting's appeal, and as broadband becomes more widely available, the appeal of television will continue to decrease.

Right? Wrong, actually.

All the evidence so far suggests that television and the Net are happily cohabiting. If TV is dying, it's not because of the Net, but because we've lazily come to assume that TV is slightly more powerful than the empirical evidence would suggest.

My mildly outlandish claims are based on viewing figures and other data from ACNielsen. Nielsen currently makes a pretty packet from tracing the viewing habits of Australian TV viewers and selling that data to advertisers. It would like to do the same online, but its impact there has been considerably muted by the ease with which Web publishers can do their own tracking.

One of the interesting findings by Nielsen in its 1999 summary figures is that habitual TV viewers aren't using the Net in ways that directly compete with television. The top four uses for such viewers were email, general surfing, product information and software downloading. TV only competes with one of these options: general surfing — and even 40-odd channels can't compete with a few million Web sites.

However, perhaps the most notable feature of Nielsen's numbers is that they show how powerful TV isn't. At peak viewing times (between 8pm and 9pm in city areas) 41% of people are tuned in to watch television. That's a high figure, but

it still means that even at its most watched, television isn't reaching more than 50% of Australians, and those figures haven't changed noticeably in the past decade. This is not something that TV station advertising reps spend much time promoting, but it's worth bearing in mind the next time you hear someone mouth off about the damaging influence of TV on our culture.

Of course, if television is a shark rather than a killer whale, then the Net is still only a tuna with a serious attitude problem. Nielsen's figures suggest that only 36% of Australians regularly access the Internet (regular means 'once a month or more'), and it seems safe to assume that they're not all doing so at once.

Other studies suggest that Net junkies aren't abandoning other forms of media; they're just becoming addicted to a whole new form. Forrester Research estimates that while heavy Internet users watch 12 hours of TV a week (an hour and a half less than their offline counterparts), the total media consumption of such users is considerably higher than people without a Net connection.

Net junkies listen to the radio more, read more magazines, and are better educated. They're information junkies, and the Net is just one more source (and not even the dominant one; TV still comes out on top, although true Net junkies surf and watch at the same time).

In the end, the Net/TV battle will be like the VCR/cinema battle of the 1980s. Everyone thought that video shops would kill cinemas. But it's 2000, and they're both still going strong. The same will go for your television, and your Net connection, even if they threaten to overlap occasionally.





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## Jeremy Horey

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He can be contacted at [jhorey@comtech.com.au](mailto:jhorey@comtech.com.au).

Why hasn't Cisco attracted the same sort of antitrust attention as Microsoft?

# It's all about style

Cisco's networking infrastructure probably doesn't play a big role in your life as a PC user, or at least not a very visible role.

If you compare Cisco's presence with Microsoft's, you will find that Microsoft has all the mind share. If you use a PC, you will see the Windows logo many times every day. It is onscreen virtually all the time when a PC running Windows is turned on. You will also see Microsoft's name on many of the products that you use on that PC. You will never see the Cisco logo.

However, if you access the Internet or a corporate network, or in some cases if you pick up a phone, the services that are available are there because of Cisco products.

What is interesting about this is that Cisco has recently overtaken Microsoft's market capitalisation. In other words, according to the stock market, Cisco is a more valuable company than Microsoft.

Microsoft has taken a hammering in the stock market because of the judgments in the antitrust case, but it will recover some of that ground quickly once an appeal is lodged. For my purposes, it doesn't matter which is on top; I just want to use Cisco to point out that businesses don't have to behave as aggressively as Microsoft to be very successful. If you compare the two companies' performance, you will see that Cisco's figures look just as good as Microsoft's.

Cisco head John Chambers is a very different person from Bill Gates. "You don't have to kill your competitors," Chambers was quoted as saying in a recent article in *The Economist*. A statement like this might sound good, but doesn't mean anything unless it reflects how the business really operates.

If you look at Cisco and its competitors, there aren't many similarities with

Microsoft. Although Cisco has a proprietary operating system for its networking devices, its competitors are not clamouring for the company to be broken up. Lucent and Nortel may find Cisco a tough competitor, but they haven't claimed that Cisco is using its position (supplying about 80% of the routers that run the Internet) to wipe out the opposition.

You could argue that this is because Cisco does not have the same opportunities as Microsoft to stamp on its competitors. I would say that it is more about how the company is run. According to Chambers, "it's not the big that beat the small, but the fast that beat the slow". Cisco aims to be as flexible and adaptable as possible.

Cisco frequently buys up smaller businesses to get access to new technologies or important innovations with existing technologies. However, in many cases, it was Cisco money that provided the seed capital for those businesses.

Cisco is a big user of the Internet. It is one of the great success stories of ecommerce. What is not so well known is that it uses its intranet to make it one of the most adaptable of all high-tech businesses. This intranet makes it possible for the organisation's management to know its exact financial situation at all times.

Could Microsoft do without its aggressive approach to business? Does Microsoft have to 'crush' every competitor? It dominates many markets in which it operates. It has huge cash reserves. It looks invincible.

The one thing that could really threaten Microsoft's future is a break-up like the one that was forced on AT&T. It is Microsoft's inability to back off, its determination to win at all costs, that has brought it to a position where it faces this possibility.



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David Hovenden

David Hovenden is a partner in Strike Zone Communications. He can be contacted at [dhovenden@strikezone.com.au](mailto:dhovenden@strikezone.com.au).

Dot coms need to realise that shedding staff is all part of the fight for survival.

## Fire at will

Many of the dot com businesses springing up at the moment won't survive. This is not because they're no good at things dot com, but because their staff management is nothing but an afterthought.

Many of the IT businesses going to the wall are heading there because under-performing staff have become a burden on the company. In a world where speed, flexibility and rapid response times are crucial, not being able to shed inappropriate (or genuinely redundant) staff can be fatal.

Imagine you are involved in one of the previously mentioned dot coms. Imagine also that one of your key appointments turns out to be not quite as useful as you first thought. What are your options?

You could allow them to go on being less productive or capable than they should. But, of course, you can't afford to do this. You need staff who can develop the business at the dizzying speeds necessary to capture the market share in the Internet business arena before the bricks-and-mortar giants enter the fray and the inevitable shake-out occurs.

You could fire the staff member, but then you run the risk of being sued for unfair dismissal. Or, you could pay them out for one year's salary, including generous compensation in lieu of stock options (remember, you are a progressive Net business).

You're sure you don't have to pay your slack worker that much, but that's what he or she is demanding and you simply don't have time to pursue the matter legally. The lawyer who sent the scary letter on behalf of your now disgruntled soon-to-be-ex-employee seems hell-bent on getting you into court — not the best publicity for a new business.

So where does that leave you? Gritting your teeth, you write the cheque and hope

to hell that the rest of your staff don't get it into their heads to start drastically under-performing; there's only so much venture capital to squander. Having to pay out a year's salary hardly makes it worth getting rid of them. You could have just employed someone else and kept them on until they left. Then of course, your under-performing staff member could sue you for constructive dismissal as well as damages for the humiliation of being replaced while they were still in the role.

It could all get very messy, very fast, and distract terribly from your goal of being number one in your corner of the dot com world. The good news is that it doesn't need to be that way.

An effective and clearly defined performance management system can provide many benefits to a budding organisation. It can confirm the organisation's objectives and clarify how they relate to the roles of every manager and team member. Similarly, it can clarify the tasks that need to be performed by every individual.

Most importantly, a performance management system allows specific gaps in individual performance to be identified and highlights the need for additional specific skills (recruitment) and training (individual development plans). In other words, it gives you demonstrable grounds for making an employee aware that they're not performing and that if they don't start performing, they'll have to look for another business to siphon off venture capital from.

A little more time spent on mundane organisational development could mean that your dot com dream is around for at least another six months.

For a complete archive of APC Two Bits columns, see <http://apcmag.com/twobits/>.



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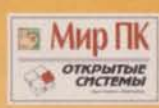
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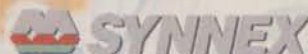
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Retailers are still blaming last September's earthquake in Taiwan for high RAM prices, but is it the real reason?

# The day the earth shook

Many of you would know about the earthquake that hit Taiwan late last September. After it crippled output at one of the world's largest semiconductor manufacturing plants, RAM prices almost doubled overnight. What most of you probably don't know is why RAM prices have been slow to drop, even though Taiwan quickly recovered its production capacity.

There are several reasons for the sustained high prices; some are clearly confined to the local Australian market and others originate offshore.

After the quake, many PC manufacturers faced a crisis. Dell and several other large PC companies were particularly vulnerable because of the way they structured their channel supply deals and the acquisition of components, including memory modules. Up until the quake, these companies had favoured a model that allowed them to purchase components as required in order to minimise the amount of stock they held. When memory prices spiked, they were forced to raise prices on many PC models.

Dell was particularly hard hit; it had to revise its earnings expectations and its share price fell.

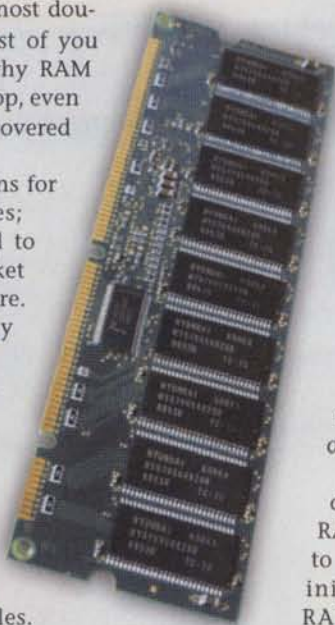
Having learnt their lesson, most PC manufacturers are ensuring that they have an adequate supply of memory mod-

ules for their PCs. According to conventional economic wisdom, this means that large stocks of chips will be held from the market, which will exert upward pressure on prices. It's hard to determine whether this has affected

the local market in Australia during the last few months, or whether suppliers are exploiting the opportunity to push up prices and test the market — as one retailer put it, "People are making their money now."

There are other reasons why prices have been slow to return to normal. Microsoft's latest addition to its stable of operating systems, Windows 2000, requires 64M of RAM to install. As migration to Windows 2000 enters its initial surge, demand for RAM will rise as people upgrade their systems to meet or better this requirement.

In the Australian market, RAM prices have been particularly slow to respond to Taiwan's production recovery, and having now stabilised they may rise slightly. The reason for this is straightforward: the Australian dollar has fallen in value from about US 65 cents at the beginning of the year to US 59 cents (at the time of writing), pushing up the cost of all imports. The release of Windows 2000 and the state of the Australian dollar



## About Price Watch

Each month, Price Watch examines variations in retail pricing and service. Investigations are conducted anonymously, either by telephone contact with retailers or through pricing details supplied on their Web sites. Prices and specifications provided here are as quoted by retailers; while we assume these are correct, we cannot accept responsibility for errors or omissions. The responsibility rests with sales staff to provide adequate information, as their employer would expect them to do with every customer. Readers are advised to always obtain a written quotation prior to making any major technology purchase.

indicate that prices will have risen slightly by the time you read this.

Price Watch originally pursued this investigation of RAM prices in response to readers' complaints about prices. Memory prices have dropped from the lofty heights of last October and some prices are now actually lower than before the quake, which is surprising considering that memory prices had already been rising slightly just before the quake.

For a complete archive of APC Price Watch columns, see <http://apcmag.com/pricewatch/>.

Retailer	Contact	128M PC100 SDRAM	64M PC100 SDRAM	128M PC133 SDRAM	64M PC133 SDRAM
Adelong Computers	<a href="http://www.adelong.com.au/">http://www.adelong.com.au/</a> (02) 8344 3191	\$245	\$125	\$270	\$140
EcomComputers	<a href="http://www.ecomcomputers.com.au/">http://www.ecomcomputers.com.au/</a> (02) 9299 0023	\$249	\$129	\$279	\$144
Forté	<a href="http://www.fortecomputers.com.au/">http://www.fortecomputers.com.au/</a> 1300 368 923	\$239	\$120	\$251	\$126
Performance Memory & Peripherals	<a href="http://www.performancememory.com.au/">http://www.performancememory.com.au/</a> (02) 9906 1872	\$240	\$145	\$260	N/A
Average price in October 1999		\$479	\$262	N/A	N/A
Average price in September 1999 (pre-quake)		\$263	\$141	N/A	N/A



One APC reader took modem manufacturer NetComm to the NSW Small Claims Tribunal and won. By Roulla Yiacoumi

## Consumer win in Small Claims

**C**ast your mind back, if you will, to our Service & Reliability column last November (see APC November 1999, page 54). An APC reader, Antony Platt of Victoria, wrote in to complain about Sirius Technologies, which has since changed its name to NetComm.

In his letter, Platt explained how he purchased a NetComm 33.6Kbps modem which stated on the packaging that it was upgradable to 56K.

When he tried to cash in on the upgrade, he received a nasty surprise. The 'upgrade' was in fact a trade-in for a completely new modem at a cost of \$170 — more than it would cost to buy a brand new 56K modem!

NetComm managing director David Stewart responded to the complaint by saying the \$170 price was "quoted to your correspondent in error" and that the company would happily upgrade the modem for \$99.

Stewart added that the original upgrade offer was so old that current customer care staff were not aware of it, but assured us that all NetComm staff "now know about the 33.6Kbps upgrade deal".

The story struck a chord with NSW reader Nick Mason, who wrote to Service & Reliability to tell of his own experience with NetComm.

Dear APC,  
I read your November Service & Reliability column regarding Antony Platt's problem with NetComm with great interest. I have also had problems with NetComm and took it to the Small Claims Tribunal to seek redress. I was awarded \$340. This is my story.

Some time ago, I bought a NetComm Roadster Ultra SVD 336. At the time, the move to 56K was very much in the news and I asked about this before making the purchase. I was told that the 33.6Kbps model could be upgraded to 56K by downloading the relevant files at no cost in the near future.



After following this up on several occasions, I was eventually advised that the cost of upgrading and trading in the 33.6Kbps would be \$235. More recently, they reduced this to \$180 — still a lot more than the \$99 that was offered to Antony Platt for his Banksia 33.6Kbps upgrade.

Following my complaints, Sirius sent me a letter which stated in part: "NetComm AM3470 upgrade to 56K — At the time, we were advised by Rockwell that this upgrade would probably just be a firmware change in line with their competitors. As it actually turned out this was not to be the case and a chip change to the board (or a board change in some products) was required. Not our fault entirely, but we had to accept the criticism."

How many other customers have been misled?

I also had another issue with NetComm. Before I bought my modem, I obtained a brochure about the product and made my purchase based on the information it contained.

Stated in the brochure was the following: "Lifetime warranty — As you've come to expect from NetComm, the Roadster Ultra comes with the NetComm lifetime warranty\*, which is your guarantee of NetComm quality and confidence in our products."

The asterisk referred to a note at the foot of the page which read in smaller print: "Lifetime on all components (dependent on availability) and five years on service." There were no other



qualifications to the warranty, or any other exclusions mentioned in the brochure, or to the best of my recollection, on the packaging.

After I purchased the product and opened the box, I noticed a warranty form inside, again featuring the lifetime warranty claim. This time, though, there was a lot of small print. Under the heading 'Terms and Conditions, Hardware Warranty', there was a statement as follows: "NetComm does not have liability or responsibility under this warranty where any cost, loss, injury or damage of any kind, whether direct, indirect, consequential, incidental or otherwise arises out of events beyond Sirius Technologies reasonable control. This includes but is not limited to: acts of God, war, riot, embargoes, acts of civil or military authorities, fire, floods, electricity outages, lightning, power surges, or shortages of materials or labour."

Since the first time I purchased a NetComm modem in 1992, I have experienced storm and power damage

on four occasions. On three occasions over the years since then, NetComm has either repaired the modem or replaced it free of charge. I assume they accepted my argument that it was covered by warranty because of the statement made in the brochure. On the third occasion, less than a year ago, the discussion and repair process took so long that I purchased another NetComm modem in the meantime, knowing I would need a second modem shortly anyway.

On the fourth occasion, Sirius returned the modem as being beyond economical repair, and denied any obligation to either repair or replace it under warranty despite the statement in the brochure. The second modem was also damaged and was returned under a different repair authority number.

They suggested I trade in the damaged modem using their standard trade-in offer posted on their Web site. This would cost \$170 compared to the recommended retail price of about \$280.

I lodged a complaint with the NSW Department of Fair Trading and took my case to the Small Claims Tribunal, seeking compensation of \$965. I was awarded \$340. No reasons were given for the amount awarded.

All too often, the customer appears to be the victim of overzealous marketing claims prior to the purchase and overzealous disclaimers after the purchase.

Nick Mason  
Somersby, NSW

Have you had a similar win in the Small Claims Tribunal against a business? Did the business take your threat of legal action seriously? Were you happy with the outcome? Email me at [ry@acptech.net](mailto:ry@acptech.net) or write to Service & Reliability, APC, PO Box 4088, Sydney NSW 1028. Letters may be edited for length or clarity. We regret that all letters cannot be personally answered. For a complete archive of APC Service & Reliability columns, see <http://apcmag.com/service/>.

## What's the Secret?



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Linux is worrying Unix vendors so much that they're giving it away. But just because it's free, doesn't mean it's open source. **By David Braue**

## Server OSes want to be free

**R**eports about the increasing adoption of the Linux operating system were mostly anecdotal until late last year, when analyst business IDC Australia found that 13% of surveyed corporations were using the upstart operating system. In February, another IDC survey found that Linux had outstripped Novell NetWare, with a 25% market share, putting it second only to Windows NT's stable 38% share.

This trend has put Unix mainstays in the firing line. In the IDC survey, Unix market share dropped from 19% in 1998 to 15% in 1999. Many major Unix operating system vendors are so worried that they are offering their bread-and-butter operating systems — many, the product of nearly two decades of R&D — for almost nothing.

Sun launched this new competitive model in January by offering its new Solaris 8 operating system free of charge. Previously, customers paid for Solaris based on the number of processors used.

It's a graphic reflection of how the Internet has changed everyday corporate computing models. Fast-growing dot com companies often need to add a steady stream of servers to support their rapidly increasing customer bases, and per-user licences mean nothing when users are numbered in the millions. By sacrificing up-front revenue, Unix vendors hope to lock in customers and sell them more profitable integration, consulting and support services.

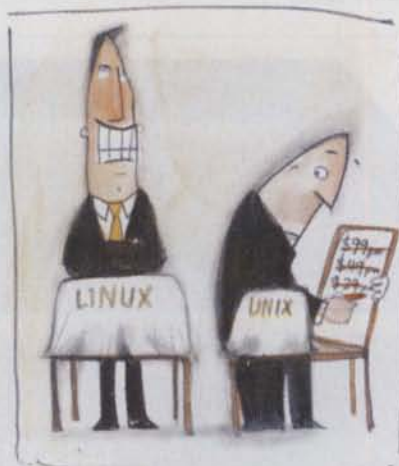
"It's a case of expanding the market from the ground up," said John Fennell, Sun Australia's national product sales manager. "The whole market is starting to change, and I guess Linux figures in this. I think of it as a marketing strategy where everyone's saying 'let's start at the very beginning'. If we can get users when they're using small machines and developing their apps, we're going to take them forward into larger machines."

IBM originally charged for its AIX version of Unix by the number of user IDs configured in the system. Now, all licences after the first two purchased are free of charge. It's a dramatic price drop, but IBM Australia consulting specialist Glenn Wightwick says it won't cause that great a revenue hit.

The cost of AIX "has never been an enormous amount of the component of

the overall system," Wightwick said. "We consider the OS as a necessary part of the system, an enabler that makes your hardware operate. Many applications we run today don't have any users associated with them in a traditional sense. We looked at that, and looked at the trends happening in the Unix marketplace, and said that we will be aggressive and include AIX essentially as part of the [IBM-supplied RS/6000 server] hardware."

There is another reason for offering AIX as its sacrificial lamb. Intel plans to release the McKinley processor, the successor to the long-awaited 64-bit Itanium CPU, sometime in the next year. IBM's commodity server range will then be based around two main operating sys-



tems: Monterey, which will combine many of AIX's strengths with technology from Sequent and SCO; and Linux, which IBM is strengthening as an enterprise-quality platform by making many of its core AIX components open source.

By all but removing price from the purchasing equation, IBM will be able to focus its customers more on the relative merits of the two operating environments. It's a strategy that comes as no surprise to Logan Ringland, IDC Australia's senior market analyst for computing hardware.

"Linux has certainly made people aware of the price of an operating system," he explains. "As Linux starts to take hold in the server space, it's a natural progression for [other] vendors to want to protect their

products and keep the market rolling along for their particular products. Services is where there's a lot of money to be made these days."

Sun and IBM have changed their pricing structure for complete server solutions, but are not adopting the open source model of Linux.

Mark White, vice-president and general manager of Red Hat Asia-Pacific, is unperturbed by the price cuts. "This is the fundamental difference between giving something away for free and providing software which is open source," he said. "We believe this is infrastructure, and it should be free. But the reason that our customers like Red Hat, and the reason we've achieved dominant market share, isn't so much that we make it available for free download. It's because we give our source code away under the GPL, and the licence truly gives control back to the customers. We're just giving them what they've asked for."

Moves to give away server operating systems will put pressure on other Unix vendors. Hewlett-Packard, for one, has no plans to offer its HP-UX free, but it now offers customers an unlimited-user version instead of the two, eight, 16, 32 and unlimited-user licences it used to sell.

Subroto Das, Hewlett-Packard systems marketing manager for Australasia, believes customers will continue to be willing to pay for the differentiating features Hewlett-Packard has built into the platform.

"There is a price for the operating system, but it is required for the development of the OS," Das said. "There are a lot of things that go into our OS, for example the fact that version 11 supports both [current] PA-RISC and IA-64 [Itanium and McKinley] processors in the same version. There is obviously a charge to keep this going, but it's not a premium. We look at it more from a customer investment protection point of view: customers can transition between PA-RISC and IA-64 any time, and don't have to change operating systems or recompile source code. It's more a customer benefit than a technological benefit."

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Almost 18 months after the US Department of Justice began court action against Microsoft, the company was found guilty of breaking antitrust laws, but that decision hasn't made the future any clearer. As Microsoft waits for news of its punishment and plans an appeal, **Angus Kidman** reviews the significance of the finding.

**T**uesday April 4, 2000 will not go down as one of Bill Gates' favourite dates. On that day, Judge Thomas Jackson handed down his ruling that Microsoft was guilty of violating antitrust laws. For Gates, the day probably ranks right down there with February 4, 1998, when Gates was hit in the face with a cream pie hurled by a Belgian political activist. While the pie incident merely cost Gates his dignity, Jackson's decision could cost Gates his fortune.

A guilty finding against Microsoft was hardly unexpected, since Jackson had already concluded last November that Microsoft enjoyed a monopoly in the operating systems market. From there, concluding that Microsoft exploited that monopoly to hinder competitors in the related market of Web browsers was a relatively short step.

Jackson had hoped the two sides could reach an out-of-court settlement, avoiding protracted litigation. That was not to be. The weekend before the decision was announced, the mediator in settlement talks between Microsoft and the US Department of Justice (DOJ), Richard Posner, resigned from his post. "After more than four months, it is apparent that the disagreements among the parties concerning the likely course, outcome, and consequences of continued litigation, as well as the implications and ramifications of alternative terms of settlement, are too deep-seated to be bridged," he said.

In his resignation statement, Posner specifically attacked the endless leaks of information which have characterised the case. "Despite my strenuous efforts to

maintain the confidentiality of the mediation, there has been a good deal of leaking and spinning, and this leaking and spinning has given rise to news reports that have created a misleading impression of several aspects of the process that should be heavily discounted by anyone interested in [adhering] to the truth," he said.

Microsoft blamed US state attorney-generals working with the DOJ on the case for the lack of a settlement. "Ultimately, it became impossible to settle because the Department of Justice and the states were not working together," Gates said in response to Posner's announcement. "Between them, they appeared to be demanding either a breakup of our company or other extreme concessions that go far beyond the issues raised in the lawsuit."

Industry consensus has pegged an inability to shift on both sides as the real reason for the breakdown of settlement talks. Microsoft was unwilling to admit any fundamental wrongdoing and the government was keen for a strong punishment to justify its heavy investment of time and cash in the case.

## Crime

The central issue in the case was whether or not Microsoft used its dominance of the market in PC operating systems to illegally block the entrance of new competitors into that market. In particular, the court had to

decide whether Microsoft tied together Internet Explorer (IE) and Windows in order to undermine Netscape's possession of the lion's share of the browser market.

On this point, Jackson's ruling was unequivocal. "Microsoft maintained its monopoly power by anticompetitive means and attempted to monopolise the Web browser market," Jackson's conclusions of law noted.

Microsoft's arguments that the OS market was competitive (using Linux and Java as examples) were rejected by Jackson, as was its claim that the integration of IE into Windows was purely for consumer benefit.

Microsoft drew some small comfort from the fact that Jackson did not find it guilty of illegal contracts with PC manufacturers — a decision which had been widely predicted to go against the company. Microsoft and the DOJ had clashed over the issue of PC seller contracts before, leading to a 1994 settlement in which Microsoft agreed not to tie in the licensing of Windows with the licensing of other products.

## Punishment

As APC went to press, Jackson was scheduled to begin the remedies phase of the trial, in which suitable punishments are discussed. Suggested remedies have ranged from splitting Microsoft up into a number of separate, competing compa-

## Key events in the case

### 1995

Microsoft consent decree bars tying the licensing of Windows to other products.

### 1997

DOJ takes Microsoft to court, arguing that it has violated the consent decree and seeking fines of \$US1 million a day.

**December:** Judge Thomas Jackson issues an injunction barring Microsoft from forcing Windows 95 licensees to include Internet Explorer.

### 1998

**January:** Microsoft and the DOJ reach a temporary settlement over Jackson's injunction. Microsoft issues a cut-down version of Windows without IE, but few manufacturers opt to use it. DOJ extends its investigations into Microsoft's conduct.

**June:** An appeals court overturns Jackson's injunction.





# GUILTY AS SIN, SO NOW WHAT?

nies to force it to separate Windows and IE. Other suggestions have included forcing Microsoft to go open source and restricting its ability to integrate other kinds of products. None of the proposals addresses in any way the massive installed base of Windows users.

The impact of the proceedings on Microsoft's share price has been phenomenal. Just prior to the findings being announced, Microsoft ceded its position as the most valuable company in the US (based on market capitalisation) to fellow technology market leader Cisco. Uncertainty over the company's future was cited as a major factor in the decline. Once Jackson's ruling was announced, the shares continued to drop, and were largely responsible for sparking the tech stock market collapse in late April (see 'The crash we had to have', page 17).

Whatever approach to remedies is taken, Microsoft has already signalled its intention to appeal the verdict. That process would normally take months, but Jackson is hoping to move for a quick decision by expediting the appeal to the Supreme Court. Microsoft is pinning its hopes on an appeal overturning Jackson's ruling, based on its previous experiences at appeal. In 1998, Microsoft won a stay **against an injunction ordered by Jackson** over the incorporation of IE into Windows, and it is hoping that similar logic will prevail in the wider case.

## Survival

In the meantime, Microsoft has to repair the perceptual damage, and not only in the

US, where it faces a flurry of private class action suits (including one from arch-rival Sun). It has also entered the radar screen of Australian regulatory authorities.

Following Jackson's ruling, the Australian Competition and Consumer Commission (ACCC) issued a statement indicating that it may pursue the decision locally. "It is likely that the US outcome will be applicable to, and followed in, Australia," ACCC chairperson Allan Fels said. The ACCC has long maintained that it would not get involved in Microsoft's local activities until a firm ruling was made.

Fels predicts that the case could have widespread implications. "The case does illustrate that market power in one market can be leveraged to damage competition in other markets." It's unclear exactly what action the ACCC will take, but it has reined Microsoft in on other fronts before. In late 1996, the ACCC sought court-enforceable undertakings after it found that a promotional offer relating to free Internet access with Windows 95 was misleading.

Internationally, Microsoft appears to be taking a business-as-usual approach as it awaits further developments in the case. Just one week after the finding, it showed off the latest version of its Windows Me upgrade to 98 — a product that continues to push the integration of IE into Windows.

However, Microsoft has made one small but significant shift in the wake of the findings: changing the emphasis of its arguments from individual consumer benefit to its role in nurturing other developers.

During a press conference to discuss Jackson's finding, Microsoft officials continued to pursue the argument that consumers have been the main beneficiaries

of its vigorous approach to competition. However, both CEO Steve Ballmer and chairperson Bill Gates also devoted considerable time to defending the central role Microsoft plays in providing a launchpad for products created by others, notably independent software developers who develop products for the Windows platform.

"Great work is done by software developers in this industry and that's where consumer benefits start," Ballmer said. He added that requests from developers for new features within Windows went well beyond the current crop of additions, including the controversial merging of Windows and IE which led to the current lawsuit.

There's nothing new in Microsoft crowing over its close relationship with its partners, but its public statements on the antitrust case to date have centred on the benefit to consumers. Its decision to place a renewed emphasis on its partner companies may well have been influenced by Jackson's finding that Microsoft *had not* violated antitrust laws in the licensing deals it signed with OEMs for Windows.

It's too early to predict the impact of any punitive remedies against Microsoft, although the market panic incited by news of the findings demonstrates the economic implications such decisions may have. Clearly, Microsoft won't be getting off lightly.

**Additional reporting by William Maher**



**October:** Hearings begin in the antitrust case proper, and continue through to June 1999. Highlights of the hearings include Bill Gates' truculent appearance in videotaped testimony, where he repeatedly claims to have forgotten major deals.

## 1999

**September:** Both sides present final arguments in the case.

**November:** In his findings of fact, Jackson concludes that Microsoft enjoyed a monopoly in the OS market. Settlement talks begin in earnest.

## 2000

**April:** Settlement talks collapse following the resignation of mediator Richard Posner. Jackson finds Microsoft guilty of antitrust violations.

**May:** Remedies phase of trial set to begin.





Internet portals offer you tailored content and Web-based email, calendars and address books. What is the real cost of these 'free' services, and why are big companies lining up to be the first thing new Net users see? **Josh Mehlman** clicks here to find out.

**T**he Web is supposed to offer unlimited choice — an endless variety of opinions, news sources and information. However, big business is heading in the opposite direction — limiting our choices and offering us bland, commercial-saturated content.

In particular, the makers of new types of access devices are crippling new users' access to the Web by tying their devices into portals that offer an extremely limited view of the Internet. These devices are aimed at attracting the 50% of Australian households that don't own PCs. Is it possible that the wave of new Net users will find the Internet they're presented with so frustratingly limited that they dismiss it as worthless?

This phenomenon isn't confined to new access devices. There is immense power in being able to set the default home page of any device's Web browser. Many people don't realise that it's possible to change this page, and many others choose not to bother. Portals are clamouring to be the first thing people see when they log on to the Net.

## Sucked into the vortal

APC named Sega's Dreamcast its 1999 Product of the Year, because it was seen as heralding a new age for the Internet. Dreamcast was expected to be the first of a range of new devices that would enable Internet access without the cost or complexity of a PC (for reviews of some of these new devices, see page 112). Although the Dreamcast is primarily a game console, the addition of Net access is a powerful selling point. Dreamcast will introduce many people to the Net, but what kind of introduction will they get?

Sega's Australian distributor OziSoft has set up Comma.com.au, a portal for Dreamcast users. When APC paid it a visit, its content lacked breadth and depth. It had three broad information categories (Life, Game and Shop) as well as email (Telstra easymail, to be precise) and a chat area that wasn't working when we tried it. Two clicks on any of these pages brought us to the end of Comma's content; its entire subject mat-

ter could be consumed in an hour. While the US equivalent (<http://www.dreamcast.com/>) is a little more advanced, the principles are the same. 'Keep it brief, keep the appeal as broad as possible and stay within the Dreamcast frameset, making sure the navigation bar is onscreen at all times. Never let on that there might be an Internet outside these walls.' While it's easy to go to other Web sites once you know how, neither the Dreamcast Web browser nor the Comma portal provide a space on the main screen to enter URLs.

Mobile phone access providers go even further than Dreamcast. They exercise heavy control over the Internet content available to WAP phones — all the Australian services are currently restricted to material that is put together by the provider or a few carefully chosen partners. If this was your first impression of the Net, you might be left thinking 'So this is the Internet. Who needs it?'

There are technical difficulties associated with some of these access devices —



mobile phones are small, TVs are fuzzy — but the reason so little content is available is that the businesses selling these devices are greedy. They know there's no money in selling hardware. They also know there's no money in selling Internet access; prices might not be dropping as fast as we would like, but there's no question they are dropping. Profits on the Internet are built on three pillars: advertising, ecommerce and content partnerships. The makers of new access devices use portals in an attempt to keep people looking at the parts of the Web that will be most profitable. And unlike the 'portal mania' that swept the world in 1998, and which continues today to some extent, these new portals don't have to rely on providing attractive content. Users of the devices have no choice but to visit these portals — at least as their first port of call. And some people may never realise that there is more to the Internet than the default portal on their access device.

## It's not my default

Where portals are tied in with access methods, hardware makers claim they're not restricting access, they're adding value to the access services they provide, or catering to the specific capabilities of the medium.

When a device like Sega's Dreamcast is targeted specifically at people who have never used the Internet or a PC, the complexity of the Web can be discouraging. "If you throw too much at new users, they'll be overwhelmed," OziSoft communications manager Stephen Leary said. "We built Comma because the Dreamcast will be targeting a different demographic to regular Net users: people who don't have the money to buy a PC and don't want the complexity. We aggregate information for them so it's not too much to swallow."

Optus@Home, Optus' cable Internet service, comes with its own browser. The Optus@Home portal is its default home page, and this can't be changed. Since most Internet content is not optimised for high-bandwidth, continuous connections such as cable Internet, Optus includes content in its portal that is specifically designed for a high bandwidth, according to Amy Smith, director of programming for Excite@Home, a joint venture between Optus and Excite. "We're offering multiplayer gaming, which highlights what the broadband pipe can offer, and that's been very successful. Another example is movie previews which are linked to information about when and where those movies are on," she said. But are users tied in to the Optus@Home portal? "We

include a browser because we want to make sure the user has all the necessary software and plug-ins. Users can switch to another browser if they prefer," she said.

Because of the limitations of mobile phone displays, ordinary Web content can't usually be viewed on mobile phones. Most WAP content is currently produced by telcos. Research from both Forrester and Ovum suggests that mobile phone access



Pick your portal

providers will eventually open up mobile Internet access, because the amount of WAP content available will grow substantially and Net-savvy users will demand access to it. However, Ovum researchers believe this will open up another battle —

between phone manufacturers, access providers and portals — over which page is set as the phone's default.

Even in cases where the default start page can be changed, controlling the browser start page can be financially rewarding. Browser developers usually set the default start page as their own Web portals — Microsoft Internet Explorer to MSN (or ninemsn in Australia) and Netscape Navigator to Netcenter. Internet service providers and other software distributors release customised versions of Web browsers that set the default home page to their favourite page. Even APC does this with its cover CD. People can change their default start page to whatever they want, but do they?

"We don't have any research to say how many users change their browser's default page, but I assume the number would be very low," Smith said. "If it's not a compelling service, you'll only ever get one page view." On the other hand, John Rolland, managing director of Telstra's online services, estimates that 60% of users change their default page. "For really content-rich ISPs such as Big Pond or OzEmail, the numbers are less," he said.

A conservative estimate would be that at least half of Internet users don't change their default start page. Even if they load up the default page and then go their own way, the single page view is still a valuable source of revenue.

A lot more online advertising revenue comes from page impressions than from click-throughs, according to Rosalie Nelson, senior consultant with Ovum's new media group. The number of page impressions is calculated as the number of times anyone views a Web page, while click-throughs count the number of users that actually follow a link to an advertiser's site. "Advertisers will pay a cost per thousand impressions, but you can also build a cost per click-through. Click-through rates have plummeted, especially for banner ads — a lot of people ignore them," she said. While advertisers only want to pay for ads that generate positive responses, "media owners don't want to pay purely on a response basis. They want to keep advertisers paying per impression." Another approach is for advertisers to pay media owners a cut of successful transactions made as a result of advertising, but "Portal owners don't want to rely on how well or badly their advertisers can sell their own products," Nelson said.

Despite these additional viewers, having browsers default to your Web page is not a guarantee of big bucks, according to Yahoo



Australia senior producer Alan Jones. "Yahoo would be interested in being a default portal, but we're a very cost-conscious company and shy away from spending money if we don't think we can make a return from it in a short time frame. When Telstra first rolled out its Big Pond service, it was looking for a default start page. Yahoo discussed it with them, but it didn't come through because we couldn't justify the expense."

The main beef the US Department of Justice (DOJ) had with Microsoft was the way it tied Internet Explorer in with Windows 95. However, there was one aspect of this that the DOJ didn't object to: the way that anyone accessing the Internet with an off-the-shelf Windows installation is automatically diverted to Microsoft's default page — MSN in the US, or ninemsn in Australia. Recent figures show Internet Explorer controls more than 50% of the browser market.

Research suggests only half of all Net users change their default page. This means a quarter of all people accessing the Net on a Windows PC automatically go to MSN. And all these count towards the more than 35 million people a month who visit MSN, according to Media Metrix. Because Microsoft has control over the default home page on Internet Explorer, MSN gets millions of page impressions for free, but advertisers still pay for the total number of page views, including passive ones.

ninemsn is the most frequently visited Web site in Australia, but it is hard to gauge how many of these visits are by default. ninemsn did not comment when APC asked how many people keep viewing the front page because they can't be bothered changing it, or don't know how.

## Trapped

Some portals believe they can provide for the vast majority of their visitors' Net needs. "If users are going elsewhere, we're not doing our job properly," AOL Australia general manager Brett Wayne said. "The portal concept as it is today on the Internet is a copy of what AOL has been doing as an online service for over 10 years. I don't believe that any portal can offer 100% of any consumer's needs, but it can provide them with a place where most of the things they want are available to them all the time."

However, most portal producers don't agree that Net users should stay within the confines of one portal. The portal may serve as an introduction to the Net, but people leave after they become more familiar with how it works. "Eventually they'll get

used to the Net and go their own way. People will discover it gradually. We just provide a stepping stone," OziSoft's Leary said. "It's amazing how quickly new users learn about the Net," Telstra's Rolland said. Yahoo's Jones puts it even more strongly: "If you try to prevent users from going anywhere else, you earn their disrespect."

What portals want more than anything is for visitors to spend time and effort on the services they provide — 'sticky' applications, which will keep them coming back for more. This is another advantage to being the first page someone sees on the Net. People are more likely to sign up for free email with Telstra easymail, for example, if the first page they see is Telstra.com or Comma.com.au, both of which offer Telstra's free Web email service. "Portals want to be your default page because they gain mind share, and users get comfortable with them, so they keep coming back," Nelson said.

"To retain viewers, Yahoo offers personalisation and registrable tools such as calendar, email, chat and a 'briefcase' to store files," Jones said. "This gives people a reason to hang around. Users invest time in these applications, and there's a high cost of switching." AOL provides a similar range of services. "Users want to come back to the portal because it gives them the things they do all the time, like email, chat, calendaring, message boards or newsgroups, stock quotes and portfolios and an address book. These require an investment in setup time for users, but provided you do that well, they don't need to go anywhere else." One of the core principles behind Telstra.com is that every section of the page can be customised to each person's preferences, according to Rolland.

All these tools, especially customisation, are part of a portal's arsenal in delivering focused audiences to advertisers, to reduce the hit-and-miss inefficiency of blanket advertising. The more portals can tell advertisers about each person — and there's an awful lot they can tell — the more valuable the advertising space becomes. "If you go to a Web site and customise it, that Web site has a much clearer idea of what you're interested in," Nelson said. "That's why everyone's getting into the mobile market, because it's very focused on customisation."

Most portals must cater to a very wide audience, which limits the possibilities for customisation. There is a strong drive to create 'vertical portals' (also called 'vor-

tals') which cater to targeted, specific markets which will attract new advertisers. These could target topics such as business, technology, sport or entertainment, or groups such as youth, women or gay men and lesbians. Vertical portals can also use profiling technology to analyse which pages are viewed, in order to build a profile of each user. This allows advertising to be targeted even more specifically. "The amount of information they can gather about us through our click-stream habits is enormous," Nelson said.

This level of tracking raises privacy concerns, but many people are willing to give up information about themselves to receive a benefit. This is the model behind many 'free' Internet access services. The results of a recent Ovum survey indicate that almost half of mobile Internet users would not object to advertising on their mobile phones, provided that it was targeted and it reduced the cost of access.



## Content

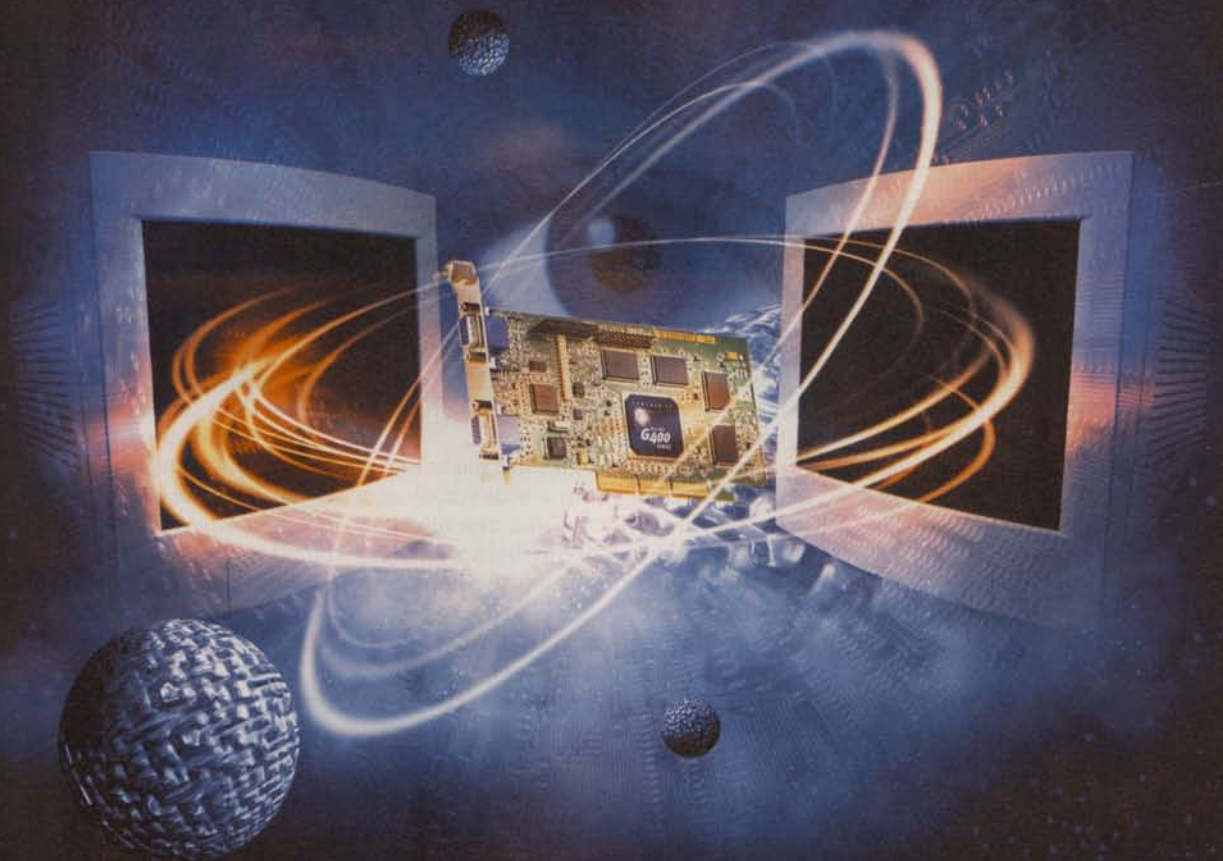
Many portals sign exclusive agreements with content providers to exploit the brand power of both the portal and the content provider. "If you choose an exclusive relationship with a content provider, you want it to be the leading provider in that market," Yahoo's

Jones said. "Usually in this type of relationship there are high-value transactions, often equity stakes, so that you have a say in the types of the content you get." The MSNBC and AOL Time Warner agreements are two salient examples.

For many portals, packaging is of primary importance. The content itself is less important. "There's so much content on the Internet; how easy the content is to access and how useful it is can be more valuable than the nature of the content," AOL's Wayne said. "There's an awful lot of financial information on the Internet, but we package that information in ways that are easy to use, and that gives users the information straightaway."

Taking advantage of the Internet's qualities is also a major consideration. "It's vital to integrate communications and community around the content," Wayne said. "One of the keys to a good online experience is to be able to share information, ideas and questions with other people who might also be interested. The Internet is inherently a communications medium





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as much as a publishing medium. If you put content online without giving people a forum to discuss it and participate in it, you might as well put it in print."

Other portals prefer to combine content from several providers. The noisiest champion of this approach is Yahoo, the self-proclaimed 'Switzerland of content', and it's not to be taken lightly — most portals have yet to turn a profit, but Yahoo has been in the black for over three years. "By doing non-exclusive deals with multiple partners, we take some useful content from all partners and build something we couldn't have done with just one," Jones said. Yahoo's partners range from Internet-only startups to established publishers trying to ensure the Net doesn't steal their audiences.

Jones says it's rare for Yahoo to pick one source of content over another. "In

most content areas, the more complementary content partners we can work with, the better. We're driven by what's best for the user much more than what's best for the business, believing that if you get the former right, the latter will follow." Yahoo's content deals are flexible enough that it can give top-of-page prominence to the content providers that are most popular with users, according to Jones.

Theoretically, deals like this mean that information comes from a wide variety of sources, both traditional and new media. "One great thing about being Excite @Home is we can be agnostic because we're not owned by a media company," Smith said. (However, at the time of writing, there were rumours about a deal between Optus and ninemsn.) "We can get news from AAP, Channel E, Bloomberg,

Fox News and ZDNet Australia, and we can get text, video and audio."

In practice, the picture is not so rosy. Of the five most popular Australian news Web sites listed on the Top100 Web site (<http://www.top100.com.au/>) at the time of writing — ninemsn, Australian Broadcasting Corporation (ABC), News Corp, Australian Financial Review and The Age — all but the ABC derive a great deal of their content from AAP newsfeeds. But this is more about the power of well-known brands than about conspiracies, Nelson believes. "The brand is a bargaining chip, and if you are Reuters or CNN, you have a great deal of power," she said. "In the early days of AOL, AOL would pay content providers to be on its site because the AOL brand wasn't strong. Now content providers pay AOL for virtual real estate."

In the current Internet climate, you expect to see product reviews followed by the words 'Click here to buy', and IT products advertorialised on TV shopping shows by geeky snake-oil salesmen. This leaves the editorial integrity of portals open to question. Portal producers were reluctant to discuss the ethical aspects of their content choices with APC. However, it's evident that commercial interests often take precedence over quality.

Commercial alliances can influence the selection of content. For example, ninemsn's technology vortal has entire sections devoted to Microsoft products, especially Windows and WindowsMedia. Its coverage of the alternatives — Linux and Mac OS, RealPlayer and QuickTime — is far less comprehensive. In this case, the bias is obvious, but it's not always so easy to spot. For example, *PC User* (an IT magazine published by ACP, which also publishes APC) was negotiating with OziSoft to provide games and PC news content for the Dreamcast's Comma portal — a deal under which Comma requested 60% of *PC User*'s online advertising revenue. However, *PC User* was later informed that the deal had been vetoed by Telstra, because of its affiliation with Telstra's competitor ninemsn.

There's no question that there is diversity on the Web, but it is sometimes obscured by media giants and commercial interests. Take your pick: cutting edge or mass market. Do you watch SBS or Ten Network news? Do you listen to Triple J or 2UE? Do you get your technology news from Slashdot or MSNBC? Do you buy music from MP3.com or Sanity? The wonderful thing about the Net is that unlike many other forms of media, it offers you genuine choices. ■

## Web site statistics

### Top 10 Australian Web sites (April 14, 2000)

ninemsn  
White Pages  
Commonwealth Securities  
Yellow Pages  
Australian Stock Exchange  
Sanford Securities  
Australian Football League  
Australian Broadcasting Corporation  
Start  
InvestorWeb  
Source: Where Did We Go

### Top 10 Australian media Web sites (April 16, 2000)

ninemsn  
Australian Broadcasting Corporation  
News Ltd  
Australian Financial Review  
The Age  
Egoli  
Sydney Morning Herald  
Seven Network  
Australian Bureau of Meteorology  
Fairfax IT Jobs  
Source: Top100

### Top 10 Web sites visited by Australian users (April 16, 2000)

Yahoo  
MSN  
ninemsn  
GeoCities  
ICQ  
Hotmail.com  
Real.com

Microsoft  
Netscape  
Commonwealth Securities  
Source: Top100

### Top 10 global Web sites used at home (February 2000)

Site	Average time spent online (hours:minutes)
AOL	0:28
Yahoo	1:00
MSN	0:54
Excite	0:28
Lycos	0:21
GO Network	0:21
Microsoft	0:10
Time Warner	0:13
NBC Internet	0:13
Amazon.com	0:14

Source: Nielsen//NetRatings

### Top 10 global Web sites used at work (February 2000)

Site	Average time spent online (hours:minutes)
Yahoo	1:42
AOL	0:49
MSN	1:29
Excite	0:36
Lycos	0:21
Microsoft	0:16
GO Network	0:31
Time Warner	0:24
NBC Internet	0:17
AltaVista	0:29

Source: Nielsen//NetRatings



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# Stewart's way: Content,

You might not think that relentlessly promoting the virtues of handmade goods, gourmet cooking and tasteful decorating is much of a plan for ecommerce success, but US lifestyle guru Martha Stewart has already made more money out of the Web than you ever will. "The e-world has taken hold, but community is not really where it's all going," she tells **Angus Kidman** during a break from counting her stash.

If content is no longer King online, then somebody forgot to tell Martha Stewart.

More or less unknown in Australia, Stewart is a national icon in the US, a respected authority on lifestyle, entertaining and decorating who also happens to be one of the most visible corporate executives in America. Australia would have to combine Tonia Todman, Stephanie Alexander, Paul Clitheroe and Ita Buttrose, seasoned with a dash of Ziggy Switkowski to come even close.

In Australia to speak at the annual Magazine Publishers of Australia Conference, the hyper-confident Stewart is enthusiastic about the potential of ecommerce to transform all kinds of businesses (including, naturally, her own), and doesn't appear to subscribe to the conventional theory that Australia is running several steps behind the US in

Net matters. "The same things are going on here that are going on back home," she said. "The e-world has taken hold."

Stewart is chairperson and CEO of Martha Stewart Living Omnimedia (MSLO), a company which encompasses magazine publishing (flagship lifestyle title *Martha Stewart Living* ships 2.3 million copies a month), a daily television show, radio spots, catalogue sales, and merchandising through both upmarket (The Gap) and downmarket (Kmart) shops. And then there's the Net.

The MSLO Web site, <http://www.marthastewart.com/>, was initially designed to provide detailed instructions for television viewers, but has now expanded to support all of MSLO's activities, providing everything from fact sheets for radio to supplier details for products featured in the magazine. There are also lots of opportunities to buy Stewart-branded products (from bed linen to garden implements to marzipan sculpture kits). The site has an estimated 1 million registered users.

MSLO presents an old-fashioned view of the world in which handcrafts, cookery, gardening and the occasional meticulously planned wedding reign supreme. A case in point is a recent cover story for *Martha Stewart Living* that gave detailed instructions on how to make toy animals out of pom-poms. However, Stewart seems to have had her finger on the technology pulse for some time.

She demanded electronic rights from her publisher when her first book, the best-selling *Entertaining*, was published in 1982, at a time when the concept was largely unheard of. Her magazines present a world view in which handmade is always better than machine-made, but she bemoans the fact that nobody has yet come up with a PDA (personal digital assistant) that's actually useful to the average household (she was due to view a new prototype

from Intel when she returned to the US after her Australian visit, but her hopes weren't high). Her magazine stable has worked with digitised images since inception, although she's still looking for a decent database system for storing and searching images.

MSLO is, perhaps inevitably, exploring new opportunities for broadband and wireless content, although Stewart foresees one obvious and much-discussed obstacle. "It's a real problem for established companies to get Web staff," she said. "Once ecommerce takes hold in a major way, you're going to have trouble getting the right people for the right jobs. Having public stock to offer is very important" — a fact Stewart acknowledged with an IPO for MSLO last October.

## The return of content

The prevailing business model for the Web is based on taking existing content and adapting it to an online medium (a media-centric approach), picking up some transactional revenue along the way. The quality of the content tends to be a secondary consideration. Stewart prides herself on MSLO's approach, which emphasises the quality of content above all else. The company's eight divisions — entertaining, decorating, gardening, crafts, holidays, housekeeping, weddings and babies — focus on core content areas. Each division is responsible for all coverage of that topic, be it on TV, in print or online — and even the development of associated Martha Stewart-branded retail products.

Of course, in the online sphere it helps that the kind of material Stewart pedals — recipes for healthy chicken dishes, craft projects, hints on how to clean your window screens — doesn't suffer from the rapid turnover and massive change typical of other Web areas such as news or technology information. "The content is evergreen, and it will never go out of date,"



Martha Stewart Living magazine: no pom-pom animals were harmed during the production of this cover



# commerce and cookery

she notes with evident satisfaction. "That's the kind of content we want; nothing gimmicky." The company also relentlessly sells Stewart (a former model) as the human face of that content, a strategy which has proved successful for other media giants such as Oprah Winfrey and Walt Disney.

While Stewart's focus on independent content development rather than partnerships ("we've never just licensed our name to anybody for anything") may appear unfashionable in an era of mega-mergers, she believes it's beginning to pay dividends as the importance of branding on the Web becomes clear. She also foresees a shift in the power base currently enjoyed by major portal sites.

"A year ago, you would have paid AOL a lot of money to be on its front page," she said. "Now that's all changed." It's clear Stewart would be happy to promote her content through such a vehicle, but she wants complete control and financial recompense which is appropriate to the value of that content. You get the feeling that if AOL didn't come to the party, she'd be in no way concerned.

In one way, however, Stewart subscribes to the prevailing Net model. She views content as a useful means to build trust and then drive people to buy associated branded products. Currently, sales from the Martha by Mail print catalogue easily outstrip Web sales, but that's changing fast. "Sales are migrating beautifully to the Internet. Ultimately, we'd like to make our [print] catalogue a 'mag-alogue' that drives people to the site." MSLO has also invested in BlueLight.com, a company developed by Softbank, Kmart and Yahoo in the US that plans to use free ISP services to bring people to ecommerce.

## The critics

Unsurprisingly, Stewart has her share of detractors. Critics have attacked her for her unabashedly middle-class viewpoint and highly prescriptive advice (her detailed explanation of how to iron a shirt drew gasps of amazement at the MPA conference, especially from women in the audience, who don't generally go to these kinds of events for an explanation of where the yoke on a shirt is and why you need to press it).



The market itself has been a little surer since MSLO went down the IPO path last year. Shares in MSLO doubled on listing last year, and remain above issue price, although the company was not immune to April's Wall Street slump.

Stewart's relentless pursuit of new revenue opportunities doesn't always gel with the Web's broader community ethos. "I suddenly got wistful for the counter-culture after listening to Martha," commentator and occasional hippy Richard Neville commented at an MPA session following Stewart's presentation, before suggesting that two-thirds of the archetypal Stewart audience were on Prozac.

Stewart herself seems unfazed by such criticisms. "[Community] is not really where it's all going," she predicted when musing on the Web's future. So what will people do with their time online if they don't connect with one another? "Ecommerce and the accessing of good, reliable information."

Of course, there are obvious flaws in that strategy. Despite Stewart's proclamation

that the whole MSLO organisation is geared to "giving people what they want, how they want it, when they need it", the cult of personality on which the company is built and its distinctly US-centric world view may make it hard for MSLO to replicate its success globally (it is exploring opportunities in the Australian market).

She also seems entirely unperturbed by questions of editorial integrity raised by her moves into merchandising. Once your main business is selling products, not information, how can you be sure that the information has any purpose other than to make you buy those products? Is that spring cleaning tip really useful, or just a subtle way of inducing you to buy Martha's kitchen brush set?

Stewart's success appears to be built on a model that doesn't allow for such doubts. Asked by a conference delegate for the most important lesson she'd learnt, her message was simple: "Persevere with an idea." Even if the idea is making pom-pom animals. ■





# Patently

Patents are intended to promote innovation, but they have become one of the greatest stumbling blocks to the development of software and the Net. As the US patent office continues to deliver ridiculously broad patents, developers are left wondering whether the current system can stand up in the new economy. Is big business, with its endless legal funds, using patent law to crush competition in the software market? **David Braue** investigates.

**I**n a competitive business environment, where a company's success or failure is measured by the strength of its last quarterly results, anything that can improve those results will be pursued relentlessly. Innovation, or the perception of it, has become the key to business success, and some businesses are being bought out just to gain access to their intellectual property (IP) and the people who created it.

IP is a hot commodity in the Internet world. Businesses are flooding patent offices worldwide with applications for patents and copyright claims. Patents were originally designed to encourage businesses to share their innovations with the world while retaining the right to profit from them. Disputes over software patents, in particular, have created a landslide of litigation that is changing the very nature of IP and the way it is protected under the law.

## Stretching the old rules

The most dramatic changes in the treatment of IP have been in the US, because it dominates the world's IT-related intellectual capital. Software applications have long been recognised as subject to copyright protection, but patenting software is a relatively new phenomenon. Patents protect far more general concepts than copyright does.

Software patent applications were initially misunderstood by patent officers, who were reluctant to grant them protection. They were considered to be mathematical algorithms, and therefore not patentable under law. Strict criteria must be met for a patent to be granted. The invention must be new, show ingenuity compared to what has come before, and the concept must have the potential to be a product or service.

The European Union's conservative approach to software patents is based on

the perception of software as a mathematical model. The issue was addressed last June at a meeting of the original signatories to the 1973 Convention on the Grant of European Patents (EPC) in Munich, which established the European Patent Organisation. At the 1999 meeting, the issue of software patents, which are banned under the EPC, was raised and deferred until this year's meeting.

Although Australia has also taken a conservative approach towards patenting software, most software developers here have relied on the protection of Australian copyright law. According to Henry Ergas, managing director of Network Economics Consulting Group, "we've always had an attitude that in principle, so long as computer software could meet the tests set out in the Patents Act, it was patentable."

"But the tests involved were somewhat more stringent than those in the US, and



# ridiculous

the result of that, and of the fact that copyright protection has been reasonably effective for software in Australia, meant that there has been less pressure for software patents to be granted."

IP Australia statistics confirm Australia's lack of interest in the patent process. In 1994 and 1997 (the last year for which data is available), a similar number of Australian and foreign-initiated applications for Australian patents were lodged through the international 1978 Patent Cooperation Treaty, about 15,000 and 17,000 respectively. By 1997, foreign-initiated patent applications had doubled to 34,000, but the Australian-originated applications actually dropped to 14,000.

The downturn in Australian patent applications may be because many Australian developers now pursue patents in the US, where the immense market attracts many inventors keen to commercialise their technology. Last year, Australian inventors were awarded 832 US patents by the US Patents and Trademark Office (USPTO).

The USPTO is the world centre for computer-related patents. In 1998, it recorded 9,115 patents in the computer-related categories of the US Patent Classification System (USPCS), nearly triple the 3,346 patents awarded in 1994 — before the Internet had really started to take off.

## The war zone

The growth of computer-related patents traces back to 1993, when encyclopaedia publisher Encyclopaedia Britannica received a patent on the concept of 'multimedia CD-ROMs with hyperlinked text'. Outrage from multimedia developers led to the patent eventually being overturned, but the company's attempts to assert control over an entire market segment have inspired numerous similar claims in the years since. Many overly broad patent descriptions have given businesses legal control of a basic idea that has later become fundamental to computing or Internet ecommerce. The US patent office continues to grant inappropriate patents.

Last November, Amazon.com was granted a patent application it lodged in 1997 on a service allowing registered customers to order a product from its Web site with a single mouse-click.

In March this year, Amazon.com sued rival barnesandnoble.com for patent infringement, entitled 'method and system for placing a purchase order via a communications network'. barnesandnoble.com resolved the claim by adding an extra page to its ordering process, making users click twice.

Another recent case was levied against Amazon.com when it gave customers the option of listening to samples of music for sale on its Web site. Intouch claims the service infringes a patent it applied for in 1996 and received last year, for a 'network apparatus and method for preview of music products and compilation of market data'.

Protracted patent battles often end in a settlement. Two such cases were settled in March: a three-year battle between Xerox and Hewlett-Packard over technologies related to photocopiers and printers, and a three-year dispute between Motorola and Qualcomm over a number of CDMA mobile phone technologies.

Large companies can afford to settle drawn-out cases, but few small businesses

can afford to put up anything close to an adequate fight. According to IP and IT lawyer Steve White, this can be a serious problem for businesses developing intellectual capital.

"You can get caught out by a patent dispute even if you've done no wrong," White said. "Unlike copyright [infringement], which involves direct copying, and you must have knowledge [of the copying], with patents you may have no knowledge. Normally, the first you find out is when you get a rude letter from the patent holder. Putting in an opposition costs \$10,000 to \$30,000, and if they sue you it's going to cost around \$200,000 to put up a serious defence."

This kind of expense can sink many small startups, so careful scrutiny of existing patents is incredibly important for any business developing Internet-related technologies. In many cases, differences in terminology mean that even a careful database search could miss patents that have the potential to stir up legal battles.

## If you want something done right . . .

Melbourne-based Haliplex develops optical networking technology for carrier network backbones. It has managed to work around the problem of the long delays inherent in the patent process: instead of relying on IP legislation to protect its competitive edge, it designs its products using a sophisticated architecture that hides its intellectual property.

"Market windows are so small nowadays that, unless you have another method to secure your IP, by the time you get a patent the window has closed and you've moved onto the next product," Haliplex R&D director Anthony Merry said. "Obviously, when you publish a patent, you publish a lot of detail about that — and that in itself may be something you don't want to do. People don't necessarily have to copy a patent, but it can show them the way. [By encrypting key product logic] the idea is to make it hard enough so that if someone is to copy the design, they're either probably capable of doing it

themselves, or it will take them so long that the market has moved on and it's irrelevant."

Merry is sceptical about the whole process. "The whole IP issue has become a bit of a joke in my mind," he said. "People are patenting commonsense concepts, and somehow they're trying to draw a distinction between what's being done in IT and what's commonsense. If it keeps going that way, I think you'll find people are applying for patents less and less because they're becoming less credible."

"We have to make sure we don't step on other peoples' feet," he continues, "and we're quite careful with legal contracts. But in terms of protecting our own IP, it will only be fundamentally novel concepts that we come up with that we'd even think about patenting, and only if we can run it in the background so it doesn't hold up the process of delivering the technology. You can't hold up for even three months nowadays."





Amazon.com — one of many companies using patents as a weapon

## Competition by patent

Small business and consumer advocates are alarmed at the rapidly growing numbers of software patents that are creating a minefield for developers. There is a growing concern that the potential threat of litigation by multinationals, which can regularly secure large numbers of patents and can afford to defend them, is stifling innovation.

"The bottom line is that unless consumers have the right to buy competing or similar products that are a result of genuine research, they just get sluggish with the bill as these larger companies drive the smaller companies out of business," White said.

"Any innovation requires substantial capital to be able to ward off potential competitors in the current environment; most inventors that have patent protection [in Australia] are not Australians, and [patents are] typically used by offshore multinational companies to give local manufacturers a hard time. You've got to find a lot of

## Patenting: Dirty work, but someone's got to do it

Careful IP management has been essential for Canberra-based Mediaware, a CSIRO spin-off which has licensed its MPEG digital video technologies to a number of multimedia software producers in the US and elsewhere.

Mediaware's technology allows real time editing of MPEG video streams. These streams use compression methods that previously made it extremely difficult to edit and analyse the video on a frame-by-frame basis. The company separated from the CSIRO in 1997, after researchers found ways to improve MPEG handling. It now counts Philips, Sun, General Dynamics and Informix among its customers and partners.

Mediaware director John Lilleyman is sceptical about current trends in software patenting. "Everyone's gone patent crazy

at the moment," he said, "and it's a minefield out there. Things that people claim as novel simply because they've moved it onto the Web seem a bit dubious, but it's almost the way business is going that you get yourself a patent portfolio for both defensive and offensive reasons. Patents have gone beyond what they were intended to protect, and I think too much of it hinders competition. People will think 'it's not worth me doing any work in that area because there are already three patent holders in that area; I've got to negotiate even before I can start working'."

Nonetheless, Lilleyman concedes it's a game businesses like Mediaware can't afford to ignore. "We're aware of the importance of patenting, and have been actively building our patent portfolio."

money in the short term to beat them, and there are very few companies that can see it through to the end."

These are major concerns of the ongoing Intellectual Property and Competition Review Committee (IPCRC), which has been working for the past year to assess the extent to which current IP legislation hinders competition and works against innovation. The IPCRC will issue a final report at the end of June, although Network Economics' Ergas, who also chairs the IPCRC, said it is unlikely to recommend the wholesale relaxation of patent controls just to

prevent foreign inventors from intimidating smaller local companies.

"There's very little doubt in my mind that intellectual property is an ever-more important feature of our economic landscape," he said. "The IT revolution is one of the most important factors underpinning that growing importance, and by its nature a great deal of IT relies on software and, more generally, on ideas that only have value insofar as they can be effectively protected. Having an efficient system of IP rights is crucial not only to keep developing a domestic IT industry,

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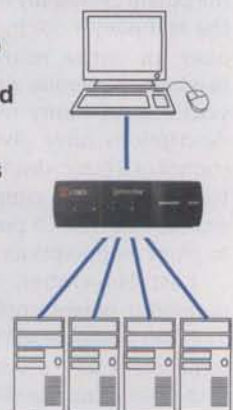
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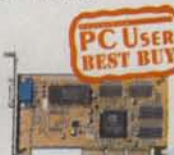
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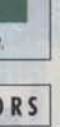
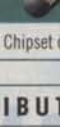
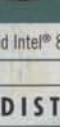
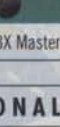
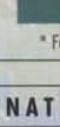


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but also to have an environment that will be capable of attracting foreign investment.

"We need to be mindful of the fact that the interests of the Australian economy are well served by ensuring that users can have access promptly and on reasonable terms to all forms of software, and that a regime which extends an undue amount of protection and power to the owners of that software would not be yielding the best outcomes for Australian users," he said. "But it's important to avoid a simplistic view which says 'IP rights are owned by foreigners and hence we should pay as little for them as possible because it will make us better off'."

### Small business headaches

As current patent terms typically last 20 years, even dubious patents may be hindering competition from innovative startups, which simply don't have the funds to become embroiled in clashes over IP rights. As a result, the development of intellectual capital could become the domain of larger businesses, which can afford costly R&D. This would leave

smaller businesses at the mercy of corporate patent lawyers.

The disparity between conventional patent terms and the demands of Internet development have led software developers to demand new forms of IP protection with shorter life cycles. IP Australia already offers six-year 'petty patents' with a fast-tracked approval process for inventions with a short shelf life, but there have been few applications for petty patents and Australian patents have limited appeal.

In the US, many developer advocates suggest that a three or four-year patent term would be more appropriate, given the rapid turnover of online technology. Shorter terms would still encourage innovation in the Internet space, but would release innovative technologies into the public domain much faster. This would prompt even faster innovation with less chance that new developments will be compromised in the long term by patent conflicts. There are also calls for a more rapid turnaround of patent applications, which take two or more years to process.

According to John Swinson, a partner with Mallesons Stephen Jaques, the patent

system "needs tuning, because it's taking too long to get patents and the quality is not as high as it should be".

Many people feel that the patent office doesn't reject enough applications, largely because it's difficult to find enough technically minded people to correctly assess the estimated 30,000 software patent applications filed every year in the US.

IP Australia processes about 16,000 patent applications a year. "All patent offices, and that includes ourselves, have challenges in recruiting patent examiners with the right skills," IP Australia commissioner of patents Dr Vivienne Tom said. "We realise you need someone who understands the art to assess the art, and at the moment we are still an attractive employer for recent graduates. We are keeping abreast with applications, but it will be a future challenge. We are going to have to constantly monitor this and be mindful about the fact that the state of the art is rapidly changing, and make sure examiners are equipped with the required skills."

See over for a roundup of some controversial patent cases.

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## Patent lather

Patent holder US patent number Date applied for/date awarded	Description	Problem
<b>Amazon.com</b> 5,960,411 September 1997/September 1999	Method and system for placing a purchase order via a communications network with one click	Critics say Amazon.com's one-click ordering mechanism is a commonsense concept and patenting it is almost meaningless, because patent infringement can be avoided simply by incorporating a second click into the process.
<b>Apple Computer</b> 5,469,540 January 1993/November 1995	Method and apparatus for generating and displaying multiple simultaneously active windows	Apple's technique was designed for displaying active help or other information windows alongside currently active application windows, but the patent for this broadly applicable concept was ruled invalid in 1998.
<b>Interval Research</b> 6,034,652 March 1996/March 2000	Attention manager for occupying the peripheral attention of a person in the vicinity of a display device	Interval's invention describes a system for attracting and engaging passers-by with advertising, information and other content presented through screensavers or as part of an online system. This new patent could prove troublesome, because it could be applied to any form of 'push' content such as Web channels, streaming advertisements and so on.
<b>Intouch</b> 5,963,916 October 1996/October 1999	Network apparatus and method for preview of music products and compilation of market data	Intouch has claimed that Amazon.com's service, which allows customers to preview clips of music sold on its site, is an infringement of its patent. Music previews have been widely used at all kinds of music sites for years.
<b>Martin Reiffin</b> 5,694,604 March 1994/December 1997	Pre-emptive multithreading computer system with clock-activated interrupt	Reiffin was describing a technique for splitting CPU time between multiple applications, which is widely used in all sorts of computer systems. The patent was struck down in 1998, for being too broadly worded.
<b>Microsoft</b> 5,860,073 September 1997/September 1999	Style sheets for publishing system	Microsoft has been blasted for patenting what is essentially Cascading Style Sheets (CSS), an open World Wide Web Consortium standard, which it helped create.
<b>Sharp Kabushiki Kaisha</b> 5,021,972 August 1990/June 1991	Word processor with colour display means	Almost all word processing software has the basic feature described in Sharp's patent: the use of multiple colours to track changes made by different users.

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OPTIONAL: WIN NT SERVER V4

## Pioneer 2000 Slimbook

SlimSoho Celeron 466:	\$2650
SlimPower Pentium III 500:	\$4130

**SlimSoho:** 12.1" TFT, Only 1.9 KG  
32M RAM, 6 GB Ultra DMA HD  
**SlimPower:** 14.1" TFT, Only 2.5 KG  
64M RAM, 12GB Ultra DMA HD  
**All with:**  
24 X CD Rom, 4M VGA  
3D Audio Stereo System  
56k Modem and 1xType II PCMCIA  
MS Windows 98 CD

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Pentium III 600:	\$2990
Pentium III 700:	\$3190

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4M 128 Bit ATI Graphic  
24 X CD Rom  
12.1" TFT LCD  
3D Audio Stereo System  
Microphone & Speaker  
MS Windows 98 CD  
UPGRADE TO: 64M RAM +\$99  
14.1" TFT: +\$690, 56K MODEM: +\$125

## Pioneer 2000 Powerbook

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Pentium III 650:	\$4390
Pentium III 750:	\$4890

64 M SDRAM  
12 GB Ultra DMA HD  
8M 128 Bit Graphic  
6X DVD Drive  
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3D Audio Stereo System  
Microphone & Speaker  
1 Type III / 2 Type II PCMCIA  
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## The up

The bad news:  
What goes up



- Computer software
- Games
- ISP subscriptions

The GST is bad news for users of IT services and software. These goods and services are all currently exempt from Wholesale Sales Tax, and so its abolition translates into zero savings for consumers. And when the GST is applied to the product or service, the costs will rise accordingly. This much is known.

What remains unknown is the margin by which prices will rise. This is because the GST has been set at 10%, but all of the savings the GST brings to businesses must be passed on directly to the customer.

Therefore the price may only rise by 4% to 5%, depending on the amount the retailer or service provider has saved. If all savings made by the retailer or service provider throughout the production process are not passed on, it is considered price exploitation and becomes a matter for the ACCC to deal with. Hefty fines

have been imposed to deter dodgy dealers from making a quick buck at the customer's expense. The ACCC can impose fines of up to \$10 million for a business, or as

much as \$500,000 for an individual, if they're found guilty of exploiting prices. Several high-profile businesses have already been issued with warnings, so it is obvious that the ACCC will not hesitate to follow through on its threats to crackdown on GST price exploitation. The monitoring of prices will depend a great deal on consumer awareness. If you suspect a retailer of taking advantage of customers and using the GST as an excuse, you can call the ACCC on 1300 302 502 to do them in.



# The Ups and Downs of the GST

The effect the GST will have on prices is a hot issue for consumers at the moment. Most people are still unsure which purchases they should make before the GST hits, and which they should postpone to save money. What prices will we pay come July 1? Although this is a simple question, disgruntled shopper **Fiona Williams** has discovered that it is very difficult to answer.



The GST is about to become a reality and everyone wants to know how it will affect them. Will a visit to the shops on July 1 prove to be an altogether painful, and ultimately more expensive, venture? Most people understand that the prices of some goods will increase when the new tax comes into effect, but exactly what this means for your bank balance is not so clear.

Shoppers are already being bombarded with gimmicks and advertisements advising them to 'Buy now before the GST!', but no-one is sure just how much they will save by doing so. The situation leaves consumers pondering the merits of delaying major purchases to see what impact the tax will have, or buying up big before the dreaded July 1 deadline. The uncertainty is understandable when even retailers and service providers themselves are unsure of the prices they will charge when the tax comes into effect. This is a sobering thought when you consider that the deadline is next month.

The GST is a complete overhaul of the existing taxation system, so it is not surprising that businesses are having trouble calculating retail prices which include a GST, explained Sebastian Ferrari, Harvey Norman national coordinator of small business. The process is made all the more difficult, he said, by the fact that "the legislation is still being amended. This makes it impossible to determine prices because no-one knows exactly what will happen."

The main point of confusion for retailers with the act as it stands is that the GST applies to *retail* prices, whereas the Wholesale Sales Tax (WST) system in force at the moment (which the consumer sees nothing of) applies to the *wholesale* price of the goods. When you consider that the changes need to be implemented at all stages of the manufacture and production process, it is understandable that determining finished-product prices is particularly difficult.

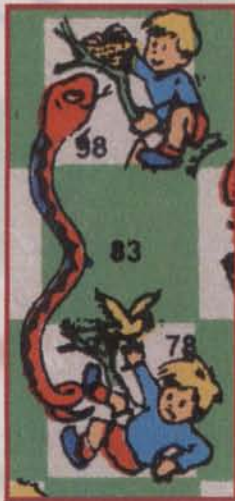
Nonetheless, July 1 is looming and prices need to be adjusted to suit. However, APC's attempts to determine the impact of the GST on the price of computer products

in real terms proved to be in vain. As with Harvey Norman, the standard line from retailers at the time of questioning was that they could not provide definitive GST-inclusive prices and were therefore unsure what the new tax would translate to (in real value terms) for the consumer. A representative from one popular retailer admitted that it has no clear idea of what prices it will charge and probably will not have a definitive pricing policy "until at least September" — two months after the tax has come into effect!

Another retailer expressed reluctance to go on the record with prices, for fear of making an uninformed estimate and thus incurring the wrath of the Australian Competition and Consumer Commission (ACCC), the independent watchdog charged with the formidable task of monitoring pricing changes resulting from the GST. ACCC chairperson Allan Fels has made no secret of his organisation's willingness to take legal action on this issue. However, the reluctance of retailers to commit to a pricing policy (so close to the implementation of the tax) is not reassuring for consumers.

Although exact figures are difficult to determine at this stage, shoppers should have a grasp of the general price changes expected to occur when the tax reform takes place. Although the tax will apply to previously untaxed goods and services, the news is not entirely grim. You can expect a reduction in the prices of some goods currently subject to WST. These include expensive electrical equipment and parts. This bodes well for IT shoppers, for whom the GST is otherwise bad news.

See the side panels for a run-down of the price changes that are due to take place. As always, bear in mind that the best way to bag a bargain is with some shrewd shopping. You should always shop around and compare prices, as fierce competition is one of the best ways to keep anticipated price hikes at bay.



## The down

### The good news: What comes down



- Computer hardware
- Electrical equipment

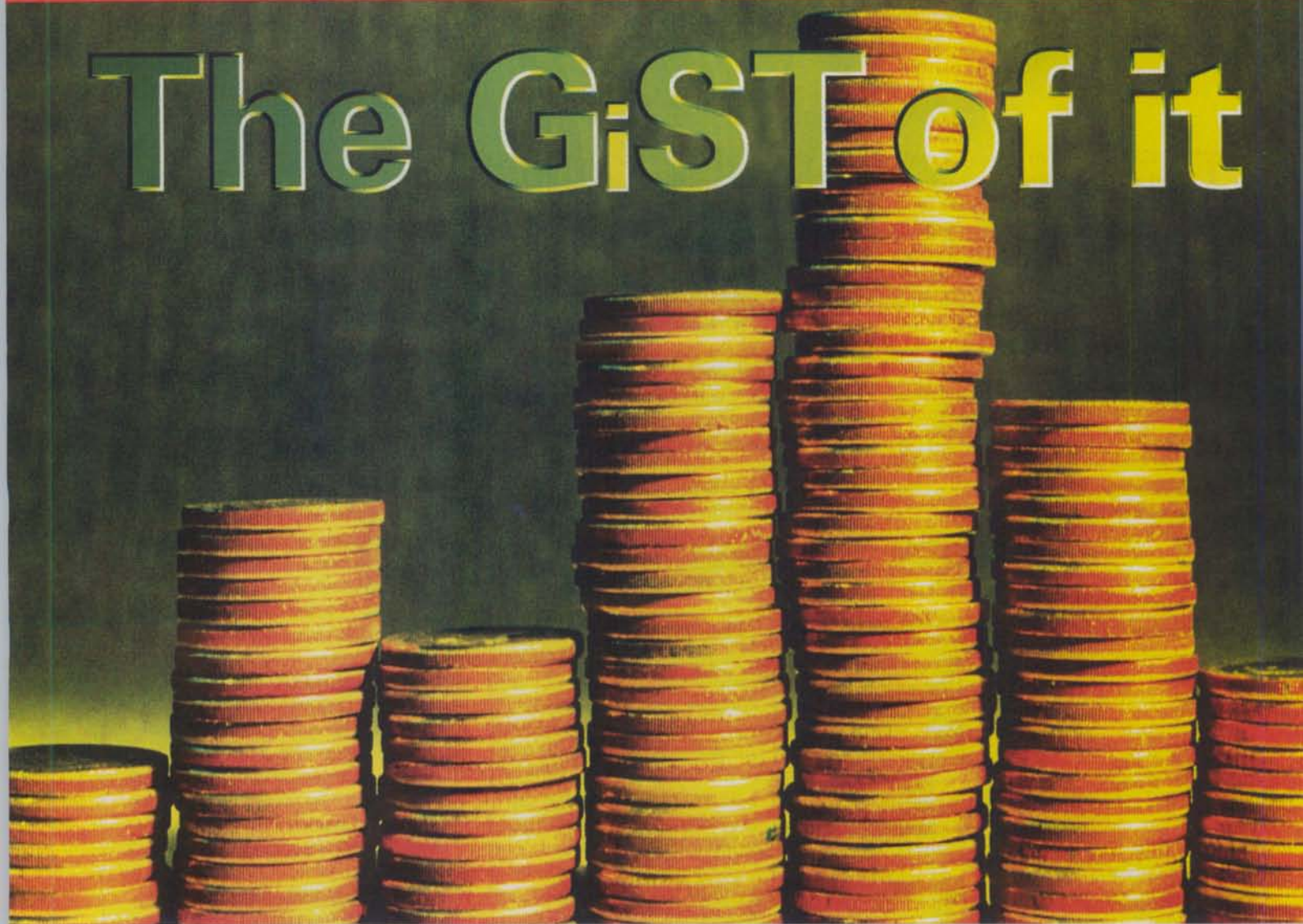
The news is good for those in the market for a new computer. You'll pay more for the software to run on it, but savings on hardware are yours for the taking, thanks to the abolition of WST. This is also the case for all electronics equipment, which is currently subject to a WST rate of 22%. The abolition of WST and the implementation of the GST in its place will mean a reduction in the total retail cost of hardware. However, the specific implications of this are difficult to calculate. It's not simply a case of simply deducting 22% and adding on 10% to determine the new GST-inclusive price. If only it were that simple. The unknown factor is the amount by which the retailer marks the product up to determine the price.

However, this is not to say that prices will plummet come July 1. In fact, there may not be a noticeable drop at all. This is because some canny retailers may have already slashed prices for fear of customers delaying purchases in anticipation of the GST and its promised savings. This could mean that the new GST-inclusive price may not actually be all that different to the prices being charged now. In the end, regardless of how the savings have been brought about, it's good news if you're in the market for computer hardware or electrical equipment.





## The GiST of it



Accounting software will be high on the software shopping lists of many computer users this year, as a result of the confusion and extra paperwork generated by the GST. Whether you want the software to run a small business or for your personal accounts, an accounting package could be the key to sorting out your finances. **Jeremy Torr** takes a look at the things you should consider to decide which package is right for you.

### SOHO financial software

SOHO refers to the small office or home office and its business culture. For most of the Jane's Mowing and Bob's Plumbing operators across Australia, tax time once meant gathering up the box of receipts and bank statements every June and taking them to the accountant to sort out. From July this year, things will change dramatically; all organisations or sole traders with a turnover of more than \$50,000 must register for GST approval.

This will mean that recorded and reported taxable amounts, both on purchased goods and services and on those that the organisation sells, will need to be sent to the Australian Tax Office (ATO) at least every three months. Yearly tax panic will be a thing of the past, and monthly account balancing a must.

Obviously, this applies only to small businesses and sole traders. The effect on employed individuals will probably be minimal. Consequently, whether or not you choose to buy a package with GST

capabilities will depend on which of these two categories you fall into. If you are expecting to work for the ACME Corp for the next 10 years, don't worry about GST compliance. However, if you think you might start your own dot com business in the near future, then GST accounting capability is a must. Any business entity, regardless of its size, that does more than \$50,000 worth of business in one financial year is required to register for a GST number. If you are running a charity, that figure rises to \$100,000. In both cases, that



isn't very high. Even very small businesses would probably handle well in excess of that, bearing in mind it includes all the money spent added to all monies received.

What should you look for in a software package? That will depend on the kind of accounting you need to use. Most small businesses still use a basic cashbook system — income recorded when the money comes in, expenses recorded when the bills are paid, overall balance in the bank — which works fine with smaller and more easily accountable businesses. The GST mandarins have recognised this and will continue to allow cashbook accounting up to a fixed turnover of \$1 million. If your turnover is above that, you are required to switch to the accrual method of accounting, where both income and expenses are recorded when they are incurred, rather than when you actually receive payment for goods and services you provide, or pay for goods and services you receive. If you are starting with a turnover of more than \$1 million, then it's accrual straight off.

There is a battle of semantics going on between all of the GST-ready packages currently on the market. One package claims it is the first to be GST ready, another says it is the first to be government approved, and a third says it has the only 100% GST capability guarantee.

The truth of the matter is that all of the software manufacturers are labouring under a cloud of uncertainty, because even the government doesn't know yet what the full effect of the GST will be. Or how to apply it fully in every case.

Despite all those 'GST-ready' claims, it is likely that software upgrades will be released soon after the introduction of the GST. At the moment, the best features to look for are automatic GST calculation, reconciliation and reporting. Ideally, you should be able to check on input, output and balance GST figures at any time.

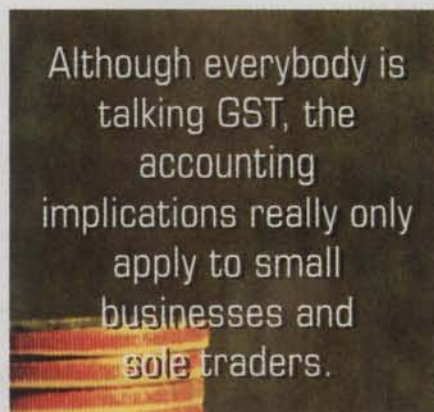
You need to be able to output this information both electronically and in print in the form of a BAS (business activity statement), the form you need to send to check GST compliance on a monthly or quarterly basis. Most packages will also include ABN (Australian Business Number) or GST number on transaction printouts, but this isn't a huge advantage because most software packages allow customisable invoices and statements that would include this number anyway.

Other handy features are basic business contact records, some job costing and quotation facility, and technical backup or local expert representation. This last

aspect will undoubtedly be of great value once the GST becomes a requirement.

In this roundup, APC looked at packages designed exclusively for the SOHO market, but which claim to suit the 'would-be big business a few years down the track', either by way of extensions or with a clear upgrade path. By keeping to a price limit of \$300, APC deliberately avoided packages like Attache, Pastel and MYOB Accounting. These are all much more powerful and comprehensive programs that are aimed at the fully networked business with more demanding reporting requirements.

Choosing a GST-ready package that suits your small business is a matter of asking what you want it to do. If your business is based on consulting and services, then stock control won't be on your wish



list. But if you are selling sunnies on the Net and using casual staff to pack them, you will have a different set of priorities.

As well as taking the kind of business you have into consideration, it is generally good practice to ask for a recommendation from your accountant — after all, they will have to download and decipher the figures.

Although a single-user solution may be more than enough for now, remember the aim of any business is to grow, and for that you may need to network your financial system. The exact choice will also be dependent on the business' projected future. Before you opt for any solution, be well aware of the upgrade options, because changing your accounting software can be very difficult.

## Personal finance software

Although everybody is talking GST, the accounting implications really apply only to small businesses and sole traders. The effect, in personal accounting terms, on employed individuals is likely to be

minimal. If this is you, then a simple cheque-book-based personal finance package is the go, one with as many built-in extras in the way of money handling as possible. Consider whether you would use features like share tracking and perhaps trading, credit card accounting, asset recording and superannuation maintenance. The possibility of linking into existing Net-based systems such as online banking, bill payment and real time share trading should also be considered. However, in all of these instances, the ultimate decider for any purchase should be how easy it is to use. There's no point in having a package with fancy features if you can't even work out how to set it up.

Personal finance software prices are becoming ridiculously low, making the advantages of a home finance package hard to resist — but be warned, the low prices are partly due to the add-on extras and commission deals built into the packages.

Insurance sales, online bank account setups, share trade options and super plans all fall into this category. Although they are billed as 'part of the package', they are all likely to cost you something in the long run and make you increasingly dependent on the single point of entry to your financial world. Don't be tempted by enhancements that will ultimately cost you more or limit your future options. Day-to-day transaction handling facilities like direct debit automation, bill reminder alerts and direct Web links to local sites are much more useful.

Probably the most important single factor in any home finance package is graphing. Being able to track what went where, percentage breakdowns and what the trends are likely to produce in the future are invaluable. Of course, all the usual auto-entry and reporting aspects are useful, as they provide the raw data that the program manipulates. The ability to handle multiple currencies is also handy for people who are based in Asia. However, the real value of these programs lies in good feedback on everyday things like how much a loan will cost and when you can afford to retire or (more likely) be out of debt.

Choosing a personal finance package isn't that hard — there aren't many currently available and they aren't expensive — but choose carefully before you commit. Make sure it does what you want, and doesn't simply act as an extension of your Web browser.

APC put two personal accounting packages and six SOHO accounting packages to the test.



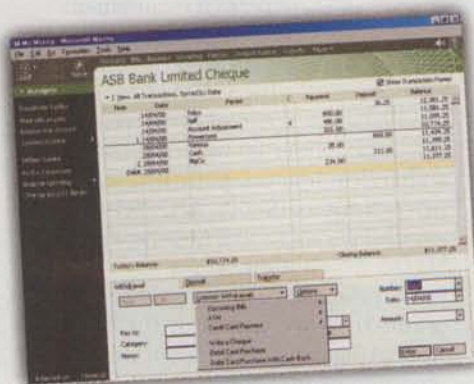
## PERSONAL ACCOUNTING PACKAGES

### Microsoft Money 2000

Although there is no manual included, Money is up there with the best when it comes to setting up and getting going. An audio-assisted Q&A session is followed by a quick video tour. When Money is installed, a Money Express icon is added to the taskbar, automatically alerting you to upcoming bills, events and so on.

Web support includes links to a range of stock sites and some Microsoft addresses. The screen layout is very good and a lot of work has been done to keep things simple. The main window is in the centre, help and tips on the right, and a set of related links on the left. However, the interface lacks colour and life; the display is too pale and there are no icons to speak of.

All of Money's functions are obvious and easy to access, and there is the usual autofill for regular entries, and template details for the main categories. The registration page uses a separate pane at the bottom so that changes are not obscured as data is entered. The basic menu options are Accounts, Bills, Business,



Investing, Planner, Decision Centre and Reports. Of these, Reports is the weakest; just three basic types of graphing means the reports have much less visual appeal than other packages.

The Business section comprises little more than invoicing and recording payments. Having the ability to alter the VAT (GST) rate to produce a basic tax report in no way justifies the Business tag. The Decisions dialog box has some good planning and advice options, such as helping to minimise loan exposure and long-term debt reduction planning.

Quicken import and export is supported, but trying to file a monthly report to the accountant before the end of the month will result in an unhelpful Report in Progress response. Although the packaging claims direct Net links to banking and online trading sites, this is simply not the case unless you have a US or UK bank.

Still, Money 2000 is the cheapest package of its kind.

**Highlights** Excellent setup and simple interface

**Lowlights** Lack of promised business, Web and reporting features

**Contact** Microsoft  
**Phone** (02) 9870 2200  
**Online** <http://www.microsoft.com/>  
**Price** \$59.95  
**In short** A fast, simple and cheap moneybox manager. If you want more, look elsewhere.

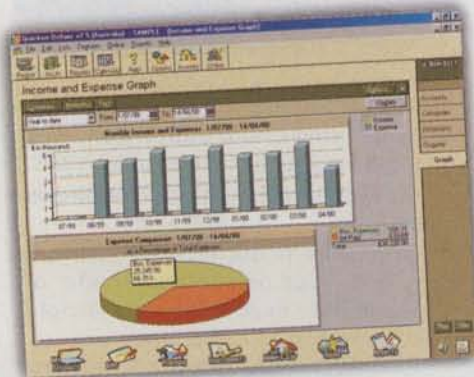
### Quicken 7.0

Quicken's packaging claims it is version 7.0, but the software itself says it is version 7.5. Quicken's context-sensitive audiovisual help makes it even easier to set up than Microsoft Money.

The interface uses a friendly, clear layout and a set of QuickTab icons along the bottom of the screen. These drop you straight into subsections for Accounts, Bills, Planning, Investments, Home & Car and Reports. All these tabs and icons can be turned off to give a very large and clear working area. The usual menu options for Register, Accounts, Reports, Calendar and Options, plus an Online button complete the line-up.

The screen is split into the main window and a right-hand pane showing How Do I? and audio help. There is also a set of tabs for reactivating the last screens accessed. Data entry is slightly more fussy than Money, as pop-up dialogs obscure the main screen, but the auto-fill and memorise options help keep clutter to a minimum.

Split entries are a little tedious in Quicken, and repeated data requests slowing the process. The very accessible and improved Edit Categories facility compen-



sates for this. The Calendar is also well designed and recurring items and cheque queuing are controlled using drag and drop from the one window. BillMinder warns you of due bills, and multiple currency support is also included.

No GST or tax support is included other than to flag personal relief eligibility at tax time — this ports into QuickTax for rapid returns. Quicken includes some very easy to use calculators for loans, mortgages, education, super and so on, and provides the best graphing in the class. ANZ and St George online banking links are available to eligible customers through the Quicken Web site.

Accessing the Web from Quicken can be a bit tricky if your Net access isn't already set up. Quicken's Internet wizard system is not as integrated as Money's, but if the PC is already online, it's no hassle. Quicken can export data to CeeData, HandiSoft, PricewaterhouseCoopers and Solution 6, but it is unable to import data. Nonetheless, these are small quibbles. Quicken is still the best personal and home finance program on the market.

**Highlights** Setup, interface, graphing, online banking links

**Lowlights** Fiddly split payments, no data import

**Contact** Reckon Software  
**Phone** 1800 674 888  
**Online** <http://www.quicken.com.au/>  
**Price** \$69.95  
**In short** Still the best personal finance package available.



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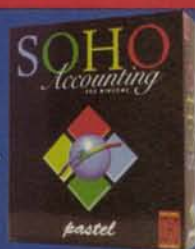
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## SOHO ACCOUNTING PACKAGES

### Easy Books

Easy Books looks to have been designed more for accountants than its claimed target audience of small businesses and tradespeople.

It provides links to dialup banking services, uses email to keep the accountant up to speed, and makes extensive use of accounting codes to keep everything in the right place.

Easy Books uses a cashbook/bankbook system to avoid the complexity of a full general ledger, but it doesn't really make the most of this simplification. It's great for keeping things simple onscreen, but can mean paging through multiple previous entries to find data.

Setup is simple, because no details or templates are available, and therefore there is no automatic ABN on invoices. The opening screen is extremely simple, where CashBook, Creditors and Debtors are the main options. These in turn have Transactions, Reports, Maintenance and Accounts

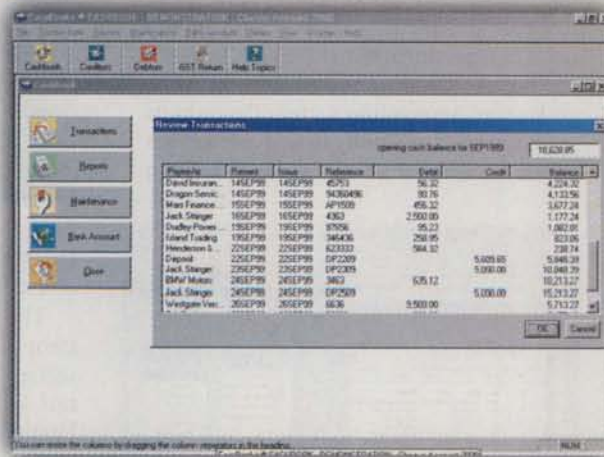
options in each area. There is also a separate GST area for entry and preparation. Easy Books' multiwindow system, like MYOB, can lead to the screen becoming cluttered and a lack of resizing capability means plenty of scrolling. Unlike MYOB, no drill down is available, so finding details on particular entries is a slow multiwindow process.

Data entry is labour intensive as there is none of the auto-fill or pop-up calculators and calendars that other programs offer. Codes identify entry categories and identifier tags, and if you get these wrong, terse error messages pop up. No context-sensitive help is available.

Reports are fairly basic. There is no graphing, the reports would be more useful for accountants than for John's Plumbing. File transfer to Cee-Data and Solution 6 is available, but you cannot import. A reasonable customer/client address book is also neatly incorporated.

Although the program is supposedly aimed at tradespeople, there is no integrated stock inventory, despite the inclusion of a stock catalogue for invoicing purposes. The GST Wizard produces GST busi-

ness activity statements from as many accounts as are being used, which is a very useful feature. Overall, Easy Books isn't that easy, but it may be effective once mastered.



EasyBooks - CASHBOOK - DEMONSTRATION - Change Account 2000 - CASH BASED GST RETURN WIZARD			
File Edit View Window Help			
Select tool Print View Previous Close			
GST Return Period from 01/01/1999 to 30/06/1999			
GST Free - Exports	01/01/99	0000.00	0.00
GST Free - Other	01/01/99	0000.00	0.00
Fixed Asset Supplies	01/01/99	0000.00	0.00
Private Use Expenses	01/01/99	0000.00	0.00
GST Credit Transactions	01/01/99	0000.00	0.00
Adjustments and rounding	01/01/99	0000.00	0.00
Grand Total	01/01/99	24000.00	1440.00
Summary			
GST Category	01/01/99	0000.00	0.00
Transfer - Credit/Debit	01/01/99	0000.00	0.00
Transfer - Standard Rate	01/01/99	4700.00	235.00
Transfer - Standard Rate - GST free	01/01/99	0000.00	0.00
Transfer - Standard Rate - Input taxed	01/01/99	0000.00	0.00
Transfer - Current Input	01/01/99	10000.00	500.00
Transfer - Total Other	01/01/99	15000.00	750.00
Input Taxed Supplies	01/01/99	0000.00	0.00
Private Use Expenses	01/01/99	10000.00	500.00
GST Credit Transactions	01/01/99	20000.00	1000.00
GST Free - Exports	01/01/99	0000.00	0.00
GST Free - Other	01/01/99	0000.00	0.00
Adjustments and rounding	01/01/99	0000.00	0.00
Grand Total	01/01/99	47000.00	2350.00

**Highlights** GST Wizard, dialup banking capability

**Lowlights** Page-at-a-time entry display, poor help, limited reports

**Contact** Easy Books  
**Phone** 1800 003 279  
**Online** <http://www.easybooks.com.au/>

**Price** \$200  
**In short** Not particularly user friendly, but adequate if you don't need many reports.

## How we tested

All the packages were reviewed from a novice's perspective. APC took note of packaging and presentation, installation and setup design and implementation, and the size and quality of the supplied manuals.

The packages were clean installed on a Gateway Celeron 533MHz machine, and each was set up using the sample files if available, then as a new user installation

using whatever configuration procedure was offered. Note was taken of online help, Web connectivity and access times to registration logon where appropriate.

Once loaded, the packages were all used to set up a virtual engineering company with a list of customers, suppliers, a small inventory and regular transactions. APC examined how easy each package made data entry, whether

there was a recurring transaction facility and how suitable the package is for use by both the small businessperson and accountant. Cheque and invoice printing were also tested, and a trial reconciliation was attempted to check for error reporting. Also noted were how easy the program was to use overall, what file exchange capabilities it had and the cost and levels of support for the product.



## SOHO ACCOUNTING PACKAGES

### Instant Accounting 98

Despite being saddled with last century's name tag, Instant Accounting 98 is a very likeable program. It is fast, extremely good at reporting financial status, and not too hard to understand.

Instant Accounting's strengths lie in its integration of mutually active areas, such as the customer account, which pops up a



list of tabs that give instant access to the company details, banking, transaction history, graphical trading patterns, invoice record and product handling details. This integration is better than any

of the competitors, and shows Sage's big company background to good effect.

Before getting to these screens, however, you have to hurdle through the setup. This is lengthy, exhaustive and exhausting, but it does have basic template businesses to choose from. Some aspects, such as standard discounts and credit terms, would be better applied to individual customers. Aspects like tax exemption and credit registration numbers are included, but others, such as ABNs, are not.

The program opens to a pleasantly clear and easy to understand screen, using basic Customer, Supplier, Nominal Ledger, Bank, Products, Invoice, Financials and Tasks icons to point the way. This system is slightly easier to understand than MYOB and QuickBooks' flowcharts.

The tabbed-window method is superb, allowing invoicing, product details and payments all to be recorded with a couple of clicks. If this does not produce the desired information, then clicking on a data field will often allow you to drill down for access to more details, but this is not as consistent or complete as MYOB. Extensive auto-fill, pop-up calcu-

lator and calendar selectors also speed up data entry. The manual is good overall, but is a bit thin on some aspects.

On the downside, it lacks a detailed inventory and can only export Solution 6 audit trail data. The Task Manager is a well-integrated application in its own right, but it **cannot import contact details**, which limits its usefulness. No direct Web links are provided, but auto-dial from the customer list is supported. Instant Accounting is fully set up for the GST, WET (wine exemption tax) and LCT (luxury car tax).

**Highlights** Excellent, highly integrated interface

**Lowlights** No inventory or cheque printing, complex setup

**Contact** Sage Australia  
**Phone** (08) 9455 4477  
**Online** <http://www.sageaustralia.com.au/>  
**Price** \$299  
**In short** It's easy to use and has good reporting options.

### MYOB FirstAccounts



In addition to the program disc, MYOB FirstAccounts comes packaged with a starter guide, a list of accredited agents and a huge manual. The program's introduction takes you through a setup process to determine the kind of business, explains the GST and potential Y2K problems, checks for ACNs, ABNs and GST numbers and allows for either a 12 or 13-month setup, just in case there is a need for an extraordinary reconciliation at the end of the year.

The number of business templates is impressive: there are cemeteries, shoe shops and motor traders. The templates

provide preselected modules — such as retail, service only and charitable offsets — to set up before starting. The opening screen gives you the option of getting stuck in straight away or practising accounting with a set of sample files.

All the basic elements such as Accounts, Sales, Purchases and Reports can be customised to suit the operation and, once set up, are easily accessed via the Command Centre which tracks the progress of monies through the business. The multiple window operation can make the screen a little crowded and fussy, especially as some windows cannot be resized for large monitors.

The basic areas of operation are general Ledger, Cheque Book, Sales, Purchase and a Cardfile database of customers and suppliers. Unlike Quicken for Business, all these have excellent integration, and the use of MYOB's 'drill down arrow' at the left-hand side of entries allows you to instantly access the history of any transaction from one point. Report and display filters are also well designed and allow relevant data to be picked out from over 70 generalised reports.

There is no detailed inventory, and you need to manually set the tax levels. Invoicing is handled well and there is good customisation of formats and layout, but purchase orders are not so comprehensive and has no built-in stock ordering procedures. Basic job costing and processing is included, and file exchange is good. Ceedata, Solution 6, HandiLedger, CaseWare and Teletax are all supported.

**Highlights** Excellent setup, easy to use and has good ABN/GST compliance

**Lowlights** No inventory or BAS reports

**Contact** MYOB  
**Phone** 1800 555 111  
**Online** <http://www.myob.com.au/>  
**Price** \$199  
**In short** User friendly and good value for small service-based businesses only.





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at Next Generation Gaming on 02 9299 9005 and forward your CV to  
ncarrington@nextgengaming.com or facsimile 02 9299 9006.



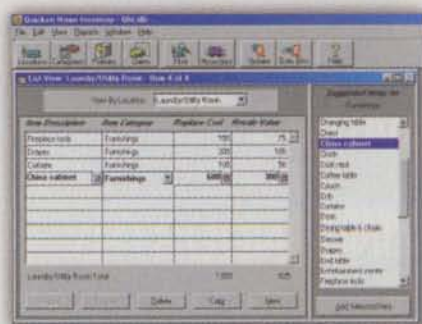
## Next Generation Gaming

Level 2, 285 George Street, Sydney, NSW 2000 Telephone: 9299 9005 Facsimile: 92999006



## SOHO ACCOUNTING PACKAGES

### Quicken for Business



There is little difference between Quicken for Business (QfB) and the cheaper, standard Quicken, and it's certainly not enough to justify the extra \$70 on the price tag. In addition to Quicken, there's a comprehensive integrated invoicing utility that meshes perfectly with the rest of Quicken and an auto-alert facility that warns of cash-flow problems. These are solid extras, but the Workflow Manager for small business that is promoted on the packaging is a joke. It includes nothing most of you couldn't whip up in Excel in five minutes and looks like 1985 PIM shareware.

The Inventory Module includes asset tracking categories like bassinet, bedroom, living room, lounge suite and laundry. It's not realistic to call this a business application. On the plus side, the rest of the package is up to the usual Quicken standard. The invoicing facility is very easy to set up and operate, but it uses the same drop-down lists as the rest of Quicken, so irrelevant invoice options for the grocers can pop up annoyingly.

Part payments, credit history and refunds are all handled well. Tax liabilities are preset to pre-GST levels, but there are customisable blank rates available. However, it is doubtful whether this standard of reporting lives up to the BAS (business activity statement) requirements. To cater for this, Quicken includes the promise of a fully GST-ready upgrade when available.

The other 'business extra' included in QfB is the Financial Address Book. This is an integrated address book, with less flexibility and usefulness than Outlook, Organiser or ACT. It is also completely proprietary and you cannot import or export from other formats, making it nec-

essary to enter all details manually. Why any small business would even consider using it is a mystery. The software comes with a Quicken for Business manual which focuses on trying to sell you a copy of QuickBooks. No mention is made of the Workflow Manager, the Address Books or the Inventory facility, but setting up invoicing, billing and account handling is covered in some depth.

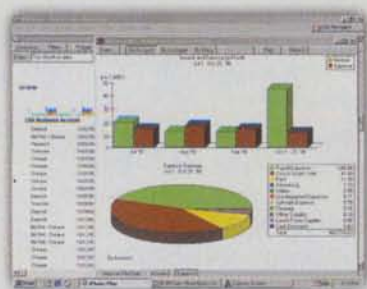
Everything considered, QfB is not worth buying. It offers little more than Quicken, and QuickBooks is much better value for only \$50 more.

**Highlights** Automatic account alarms

**Lowlights** The extras that differentiate it from Quicken

<b>Contact</b>	Reckon Software
<b>Phone</b>	1800 674 888
<b>Online</b>	<a href="http://www.quicken.com.au/">http://www.quicken.com.au/</a>
<b>Price</b>	\$149.95
<b>In short</b>	Not worth buying.

### Quicken QuickBooks 7.0



QuickBooks is a much stronger performer than Quicken and it is still the easiest package to set up and run.

As well as the CD, the package includes some chunky and well-presented manuals. The CD starts with a few chatty introductory videos, followed by a lengthy Q&A session which allows you to spell out your preferences (the kind of business you run, tax codes used, invoice style etc) in advance. Once this lengthy process is finished, QuickBooks springs to life with its friendly Navigator screen with a number of options to choose from: Sales, Purchases, Banking, Taxes-Accountant, Company and Business Resources. Each of these has its own pop-up menu options for the usual

swag of ledger, form entry, transaction tracking and reporting screens.

It uses an excellent tabbed window system for jumping from zone to zone rapidly. QuickBooks excels in the graphing and reporting areas, providing a solid range of formats that are easy to follow and can be customised to suit. Pop-up Help and How To windows are handy for first-time users, avoiding the need to thumb through the manual.

Cash and accrual accounting are supported, and both are easily transferred into a GST-ready format for the production of BAS reports. Online banking with the Commonwealth Bank is supported, which is a real plus for many small traders who have limited time to enter transaction details. However, online bill payment is not available. Other high-level features include an Accountant's Review facility, and a basic inventory management. No payroll facility is included.

Excellent auto-fill and consequent forms automation makes data entry easy. This assists with cheque and invoice printing, and batch processing is also available. Strangely, the Calendar that features in

standard Quicken is not used, but bill payment alarms can be activated if required. Import/export is done through IIF format data files. All the details of any ledger entry can be accessed by clicking the mouse.

**Highlights** Easy to use, superb interface, GST ready

**Lowlights** No payroll or purchase order facility

<b>Contact</b>	Quicken
<b>Phone</b>	1800 674 888
<b>Online</b>	<a href="http://www.quicken.com.au/">http://www.quicken.com.au/</a>
<b>Price</b>	\$199.95
<b>In short</b>	Easiest to use, but still powerful. Top value.

A complete version of QuickBooks 6.0 is on this month's cover CD, along with a special upgrade offer for APC readers.



## Editor's Choice

Personal accounting  
Quicken 7.0SOHO accounting  
Quicken QuickBooks 7.0

Each year it gets harder to split the top packages; they all leapfrog the previous year's packages, adding more and more features to their products. In APC's roundup, the differences between the packages hinged on two main points: whether they were GST ready and easy to use.

Almost all of the SOHO accounting products reviewed have serious accounting muscle, albeit in slightly different ways. MYOB FirstAccounts has some of the best accounting facilities with superb accessibility, and Simply Accounting has an incredibly wide range of features for a SOHO package.

However, when it comes to the crunch, the simple interface combined with powerful reporting and comprehensive GST capability give QuickBooks that important edge over the rest. Consequently, it again wins Editor's Choice in the SOHO category.

In the personal accounting field, Quicken's superb interface and simple bank-statement style earn it the number one spot over Money 2000. It's a good year for Reckon Software.

## SOHO ACCOUNTING PACKAGES

## Simply Accounting 7.0

Simply Accounting is outstanding value for money. Its capabilities include inventory, basic payroll and project management, cash or accrual accounting, OFX online data exchange, GST reporting and asset management. It also has very good manuals. Admittedly, there are quirks due to its Canadian heritage, but it is very capable and easy to use.

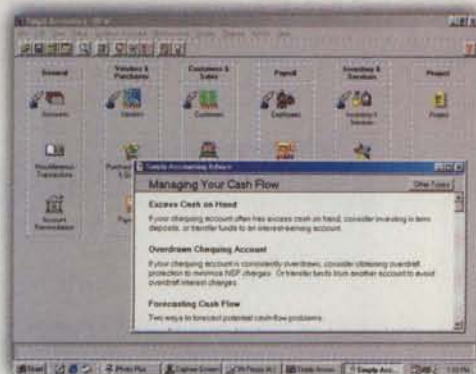
Setup is thorough, but the lack of specific provision for ABNs or GST numbers is a nuisance.

Like MYOB, Simply Accounting has a huge range of preformatted business templates. There is also a Business Startup Guide which includes hints and tips on how to register, run and finance the fledgling company. Lotus ScreenCam videos flesh out working details, and the help section is well thought out.

The layout of invoices and cheques is not as customisable as in some other programs, but there is still plenty of scope for most users. Security is also a big advantage, and up to three passworded access levels are available, and once your audit trail is up to date, you can make it non-erasable.

Both cash and accrual systems are supported. The screens are all separately windowed, but they auto-minimise to avoid clutter if another screen is opened. Most of the entry fields are auto-fill, but the user can also make special entries manually. All category and numbering sequences can be customised, and a status bar lets you know what activity or entry is normally required next in the sequence.

It's light on inventory and project management, but these features are still more than adequate for most businesses,



and an assembly module helps analyse costs of assembled products. GST support is not as automated as in some of the other programs; rates have to be set by hand and there are no standard BAS reports.

Graphing is good, but not quite up to Quicken standard. Data can be exported directly into Access if required. Despite the lack of local payroll, GST and ABN support, Simply Accounting is a very good package.

**Highlights** Superb range of features, easy to use

**Lowlights** Some local GST/ABN requirements missing

<b>Contact</b>	ACA Pacific
<b>Phone</b>	(03) 9674 8188
<b>Online</b>	http://www.accpac.com/
<b>Price</b>	\$169
<b>In short</b>	High performance, low cost. It's well rounded and nearly ready for Oz.

## Are you really an entity?

In most cases, a business entity (a registered business or corporation) applying for an ABN (Australian Business Number) will also be automatically registered for GST. The ABN is designed to allow the government to keep tabs on any business' tax and compliance requirements using a single reference. However, ABN registration is also being used as a back-door method to weed out 'emplactors' — contractors that are basically employed by a single company,

thus avoiding payroll taxes and allowing extra business expenses for the supposedly independent company.

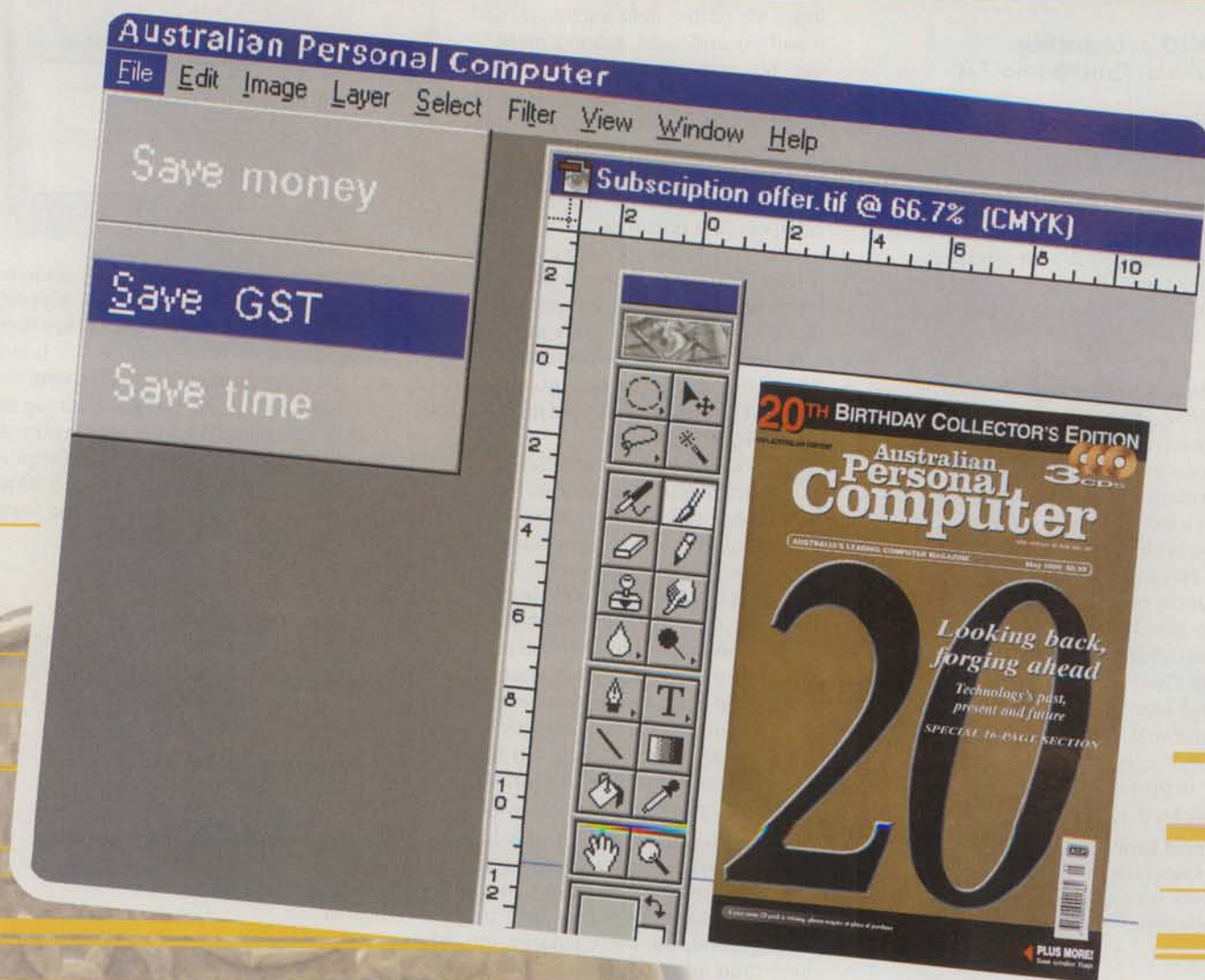
In some cases, ABNs and GST numbers have not been granted because the entity is not entitled to input and output GST tax accreditation. This may become an issue in a workplace that relies increasingly on contracting out work to its former employees. Unless the employee is running a genuine business outside the 'parent' company, they won't

have an ABN or GST number, therefore they have no entitlement to claim back GST debits.

Many large companies are being very careful and insisting that all new contractors have ABNs and GST numbers. This could make things be difficult if all your previous workings have been with a single company, or alternatively out of an esky full of \$100 notes. For more details about requirements of the new taxation system, see <http://www.gststartup.gov.au/>.



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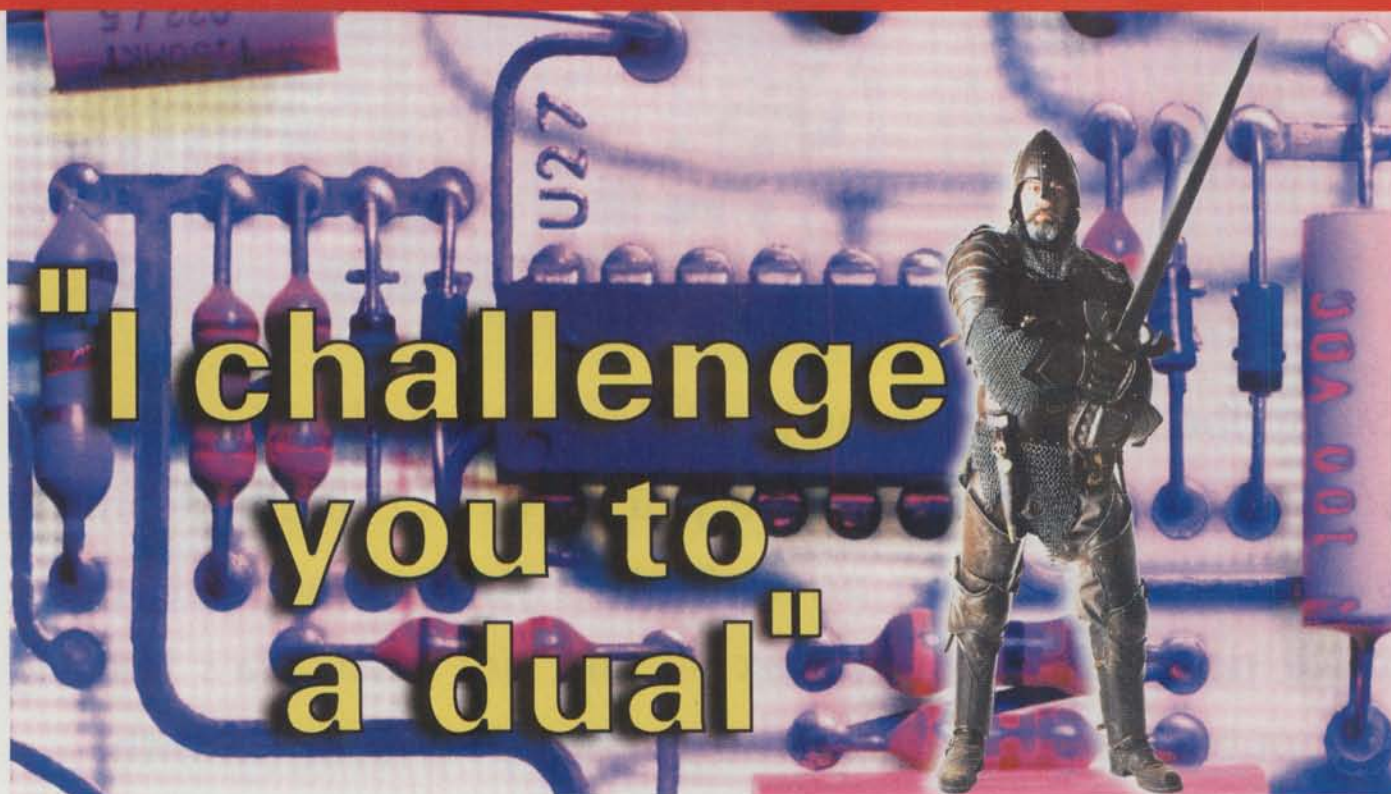


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DPSC - APC0600



# MULTIPROCESSORS



Is it better to buy one expensive CPU or two less expensive ones? Until now, multiprocessing was a pipe dream for most consumers, so the question of whether to get one or two processors was purely academic. The release of Windows 2000 has opened up opportunities for multiprocessing systems that are useful for more than just workstation or server applications. **Darren Ellis** investigates.

**A** word of warning: dual processor systems are not for the novice. If you're running Windows 95 or 98 and aren't ready to upgrade to Windows NT, Windows 2000 or current versions of Linux, you might as well give up on the idea. Earlier versions of Windows do not support multiple processors, so you won't get any benefit from the investment.

To give you an indication of the economics of dual processing, as APC went to press the cost of a 800MHz Pentium III processor was roughly \$1,600 — about the same as two 650MHz Pentium IIIs. Multiprocessor motherboards are more expensive than single-processor boards. There are currently no motherboards that support dual Athlons, but some are expected to be available later this year.

## What do you need to get multiprocessors working?

You cannot just buy a multiprocessor motherboard and expect it to work with whatever processors you put in it. Both processors in a dual-processor system

must match exactly, hence the term symmetric multiprocessing (SMP).

As mentioned, you'll need an operating system that supports multiple processors. Windows 2000 Professional supports two processors, Windows 2000 Server up to four, Advanced Server eight and Data-Center Server supports up to 32. The Linux 2.2 kernel supports up to 16 CPUs, and BeOS supports two.

There are multiprocessor motherboards readily available for the Pentium II, Pentium III and Xeon, but getting boards for other processors generally means buying an entire system with a custom motherboard built in. There are multiprocessor Socket 7 boards, for instance, but you'd have a hard time finding them in the shops. Abit's new BP6 motherboard has caused quite a stir with its unique ability to run dual Celerons, as Intel actively discourages this configuration.

Multiprocessing under Windows and Linux is thread-based. Each application creates one or more threads that are normally used by the operating system for multitasking purposes. In a multiprocessing system, these threads can be divided

up between the processors to balance the load on the CPUs. It's not perfect, because not all threads require the same amount of CPU time, but a good operating system will partition the threads so that the CPUs have more or less equal loads.

Software makes use of SMP to varying degrees. Many consumer programs will only use one thread, applying all their work to one processor — so you could end up with processor A doing all the work, while processor B sits idle. Some software can make use of multiple processors, but are generally only high-end applications such as industrial design, databases and transaction crunching programs. Fortunately, there's more multithreaded software being released, such as Quake III Arena.

SMP systems are put to best use when running multiple applications at the same time. For instance, you could run a video in one half of the screen and use an editor in the other without slowing it down. It's important to remember that dual processing is not about speed, exactly: it's about being able to do twice as much at the same speed. Rather than play one video, you can play two. You can't make the same video



play twice as fast (not without some clever programming that multithreads the playback, anyway).

## Stability and productivity

One of the most underrated advantages of multiprocessing is its effect on system stability. When some programs crash on a single-processor system, they drop into a loop that sucks up all system resources. The system is still running, but it's impossible to cancel the process in question because you have no resources with which to initiate the kill dialog.

However, a rogue thread can only flood one processor in a multiprocessor system. You still have at least one processor free to kill the thread and restore your system.

This principle applies to other areas as well. Actions that would normally flood a single processor have less effect on a multiprocessor system. With a multiprocessor system, you can still operate your other applications normally with minimal loss of productivity. This is a real bonus if you use an application that, on a single-processor system, requires you to cease all other applications while it executes, such as rendering a film, compiling a program or encoding/decoding MPEG video and audio.

## Speed is not the issue

The problem with testing multiprocessor systems is that the majority of benchmarks are designed to test raw speed. As we mentioned, multiprocessing does not increase the system's speed, it increases the workload the system can execute at normal speed.

Most benchmarks do not take typical usage patterns into account. You often have numerous applications open at the same time, using multiple threads. Benchmarks only open one program at a time and run in a single thread.

Some of the more recent benchmarks — notably Ziff-Davis' Winstone 99 — take multithreading into account, and

they open and use several applications at once as part of the scripting process. In most cases, however, these are productivity applications, which tend to require little processing power when idle. Consequently, the benchmarks don't accurately reflect the capabilities of multiprocessor systems.

Most games run only in a single thread, so you won't notice much difference on a multiprocessor system (there will be a slight difference, as system functions are separated from game functions). However, a few newer games are multithreaded and can take advantage of multiple processes. Either way, a multiprocessor system won't be a great advantage when it comes to playing games, and using games to benchmark a system can be deceptive.

Synthetic benchmarks like WinBench, Viewperf and SPEC run almost exclusively in a single thread, and are best at determining the effect of offloading system-level processes on a running application.

## Two heads better than one?

In addition to the dual-processor system reviews, APC also tested the AlphaServe Dual650 (which ran dual Pentium III 650MHz processors with 256M of SDRAM) with only one processor. A third test was then run with half the RAM.

The dual-processor configuration shone in BAPCo SYSmark2000. It showed a marked superiority over the single-processor configuration. The Winstone 99 Dual Processor inspection tests (which look at the potential of the two processors) also reported extremely high scores for the dual processors with twice the RAM.

The graphics benchmarks did not show much of a score difference. Any data is loaded into the cache to be divided among the processors, and sits there until any conflicts are resolved. This takes place across the system bus, and conflicts can chew up system bus bandwidth. This became apparent with the graphics tests, in particular the results from the Ziff-Davis Business and

High-End Graphics WinMark 99. The Alpha, when running a single processor, actually outperformed the system when it had both processors blazing. RAM had no effect on this result.

Having a dual-processor system only had a major effect on speed when we ran the Quake III Arena timedemos. This is one of the few consumer-level programs that has SMP support, but this only works with a few graphics cards and drivers (currently nVidia's Detonator reference drivers for the TNT and GeForce range are the only ones supported). The Alpha is the only system APC ran Quake III Arena on, and even then a GeForce with 64M of DDR memory had to be installed. The drivers used were the Windows 2000 beta Detonator reference drivers from nVidia.

The timedemo was then run at two resolutions: 800 by 600 and 1,024 by 768 with SMP disabled. Both of these tests were at 16-bit colour with 16-bit textures and returned 49.7fps and 48.9fps respectively. Once SMP was enabled, the frame rates soared. It jumped by an amazing 16fps to 66fps at 800 by 600 and a further 11fps to 60 fps at 1,024 by 768 — an increase of about 32% and 22% respectively. On beta drivers that's quite good.

## The other systems

In addition to the Alpha, APC reviewed three other systems. The specifications for this review were not too restrictive — after all, there is a thin line between high-end consumer systems and low-end workstations. APC stipulated two processors, a minimum 128M of RAM, and for price reasons, no Intel Xeon systems were allowed. The machines had to have Windows 2000 Professional installed on a FAT32 drive.

The systems APC received ranged from a Dell system that would look just as comfortable on the desk in the office as at home, to the towering Alpha and the boxy server casings of the NEC and the Gateway machines. The specifications include two prices: one for the dual-processor system, and one for the single-processor version.

Benchmark	Business Graphics WinMark	High-End Graphics WinMark	Business Winstone 99	Winstone 99 Dual Inspection Winstone	High-End Microstation	High-End Photoshop	High-End Visual C++	SYSmark2000
Single processor	144	427	33	4.87	3.2	6.76	5.96	134
Dual processor, 256M	140	376	31.8	6.08	3.57	9.54	9.25	142
Dual processor, 128M	140	376	31.5	5.13	3.55	5.4	8.49	139



## Alpha Computer AlphaServe Dual650

The Alpha performed particularly well in the benchmark suite. It uses 650MHz Pentium IIIs, but the amount of RAM is what provided the major performance boost. The Alpha has a motherboard with the Intel 840 chipset and an impressive 256M of SDRAM.

It was fastest in most of the tests, including the majority of the Winstone dual inspection tests, where it beat the Dell's faster processors. (When half the RAM was removed, the scores settled to a level consistent with the other systems.)

All of other scores were high. The machine has a 36G Ultra 3 SCSI hard drive that beat every other in the Ziff-

Davis Business and High-End WinMark 99 tests. With just an ATI 3D Rage Pro, however, its performance in the graphics tests was not as impressive.

Alpha Computer has several OS options, including Windows 95 and 98, which (as mentioned in the introduction) do not have dual CPU support. If you're looking for a single-processor system with the option to go dual, then the AlphaServe Dual650 is the way to go.

**Contact** Alpha Computer  
**Phone** (03) 9415 9177  
**Online** <http://www.alphacomputer.com.au/>

**Price** Dual CPU \$6,500,  
single CPU \$5,770  
**In short** Would make a great  
file server.



## Dell Precision 220 Workstation

Unlike the business machines supplied by the other three manufacturers, the Dell Precision 220 Workstation has the right features for medium to large businesses or the home. In addition to the two 800MHz Pentium III processors, it has some very impressive components.

The Dell has a Matrox G400 MAX dual head video card, which is not as fast as GeForce adaptors, but still has impressive capabilities. The system sent to APC had a great 17in LCD screen — which adds \$4,400 to the price of the system. It normally comes with a 17in flat-screen Trinitron CRT.

This machine comes with 128M of RDRAM and did well in the tests. At times it came second to the AlphaServe Dual650, particularly in the Ziff-Davis Winstone Dual Inspection tests, but the Dell has only half as much RDRAM as the Alpha. As expected, the Precision 220 Workstation topped both the CPUmark 99 and FPU WinMark 99 tests and absolutely blitzed the competition in SYSmark2000. The hard drive was also fast.

**Contact** Dell  
**Phone** 1800 292 313  
**Online** <http://www.ap.dell.com/au/>

**Price** Dual CPU \$11,073,  
single CPU \$9,653  
**In short** Great features. Would be  
cheaper with a CRT monitor.



## Gateway 7210 Server

The Gateway 7210 Server is similar to the NEC system in that they share nearly identical specifications. Both are in minitower cases that look conventional from the front, but are about twice as deep. Imagine the AlphaServe Dual650's full tower casing laid on its side. This means there is more room to move inside the machine when you're swapping parts or upgrading.

The system features two Pentium III 600MHz processors and 128M of SDRAM and it trailed the pack overall in the tests. It was just inched out in most of the tests by the identically configured NEC. The biggest difference between the two systems was in the Ziff-Davis Business Graphics WinMark 99, where both

machines achieved low scores. The NEC scored a fraction higher, but the reverse happened in the High-End Graphics WinMark 99. The graphics results mean this machine is suitable for a file server and little else.

The system's 18G Ultra 2 SCSI drive was also slower than the other systems, and was better at the High-End Disk WinMark 99 than the Business Disk WinMark 99, where it was slower than the Dell's Ultra ATA/66 drive. The system has a drive array at the front of the case for easy access to up to six drives, but the test machine did not include a RAID controller.

**Contact** Gateway  
**Phone** 1800 500 742

**Online** <http://www.au.gateway.com/>  
**Price** Dual CPU \$5,419,  
single CPU \$4,724  
**In short** A basic system with a small  
hard drive.





# ASUS AGP-V7700

## Go Deep into Unprecedented 3D Graphics World

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- Powered by the world's fastest GeForce 2 GTS GPU
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- Dynamic Overclocking
- Over-heat Protection
- Fan RPM Monitoring
- AGP Power Level Monitoring



[www.asus.com](http://www.asus.com)

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#### Australia:

NSW (02) 9742 3288  
QLD (07) 3857 5969

VIC (03) 9561 9899  
WA (08) 9445 9500

#### Newzealand:

0800 800 905



## NEC Express5800/120Ld

The NEC Express5800/120Ld is one of two systems in these reviews to come in a minitower casing, and like the Gateway's casing, it's twice as deep as a standard minitower case. Also like the Gateway, the NEC Express5800/120Ld has two 600MHz Pentium III processors and 128M of RAM. The performance of both systems was very similar, but the Gateway 7210 Server was inferior to the NEC in all of APC's tests.

In the tests where RAM and processor speed have major effects — Ziff-Davis Business Winstone 99, SYSmark2000 and the Dual Processor inspection tests — there was little difference in the scores, but the Gateway was a little slower. Graphically, the NEC has little going for it, and it is a true business machine with basic 2D abilities. It outperformed the Gateway by

eight points in the Business Graphics WinMark 99, but was slower in the High-End Graphics WinMark 99.

The Express5800/120Ld has a 18G hard drive which, like the Alpha's drive, is one of the first Ultra-3 SCSI drives APC Labs has seen. The test results for the NEC's drive were high, but not nearly as high as they should be for a SCSI-3 drive. The Dell's 7,200rpm Ultra ATA/66 drive scored close to NEC's drive in the Business Disk WinMark 99, but scored higher in the High-End Disk WinMark 99 test. Nothing matched the performance of the Alpha's drives.

The NEC costs a lot more than the other systems. For businesses, there would be better support and service than the other systems, but it's a little expensive for the average shopper.



**Contact**  
**Phone**  
**Online**  
**Price**

**In short**

NEC  
1800 632 777  
<http://www.nec.com.au/>  
Dual CPU \$7,650,  
single CPU \$5,388  
Big, dull and expensive, but it  
has the essentials.

### How we tested

To test the performance of the systems submitted for review, APC Labs used a mixture of the Ziff-Davis Winstone 99 and WinBench 99 suites of benchmark software, the BAPCo SYSmark 2000 from MadOnion and SPEC's Viewperf.

**Winstone 99** runs a suite of modern business and graphics applications, records how long a system takes to complete these tasks and gives an aggregate score.

The **Winstone Dual Processor Inspection** returns four scores that APC referenced, and tests the dual processing abilities of the machine under different loads.

**WinBench 99** contains a set of sub-tests, each designed to find out how fast each component of a system really is.

**Business and High-End Graphics WinMark 99** measures the system's graphics performance when performing video tasks associated with common business applications, as well as demanding multimedia and 3D applications.

**Business and High-End Disk WinMark 99** provides a measure of how a system's hard disk handles a load equivalent to that demanded by the business applications used in the Business Winstone 99 test.

**CPUmark 99** compares how fast the processor, memory and cache subsystems are.

**FPU WinMark 99** is a 32-bit floating point processor test.

**3DMark 99 Max** and **3DMark2000** test 3D accelerators in a real world environment, throwing tests at it designed to simulate the conditions imposed on them by games and applications.

**BAPCo SYSmark2000** is an application-based system test that returns a score based on a system's business productivity and Internet content creativity abilities.

SPEC's **Viewperf** profiles OpenGL calls made by a set of workstation applications to test the 3D graphics capabilities of a system.

All the systems tested were shipping versions available to the general public at the time of publication unless otherwise stated. Please note that because of the lead time between testing the machines and publication, some specifications and pricing may have changed. Be sure to check this information with the retailer before purchase.

These tests were performed without independent verification by Ziff-Davis, and Ziff-Davis makes no representation or warranties as to the results. WinBench is a registered trademark of the Ziff-Davis Publishing Company.

### Editor's Choice



**Dell Performance**  
**220 Workstation**

**Highly commended**  
Alpha Computer AlphaServe  
Dual650

This was a close call between the Dell and the Alpha, but the Dell wins hands down for great performance at a good price. The Alpha did beat the Dell in most of the tests, but the price difference between the Dell (CRT version) and the Alpha would allow you to double the Dell's RAM, and then you'd also end up with two 800MHz (rather than 650MHz) processors.

The Dell also has a powerful graphics card, with strong 2D and 3D performance capabilities. The system's dual processors and dual monitor support would make it an enticing option for both designers and gamers.

On the flipside, the Alpha has a large and very fast 36G SCSI drive, which is double the capacity of the Dell's Ultra ATA/66 drive. The Alpha's drive was slightly faster, but the Dell outperformed the other systems' SCSI drives.

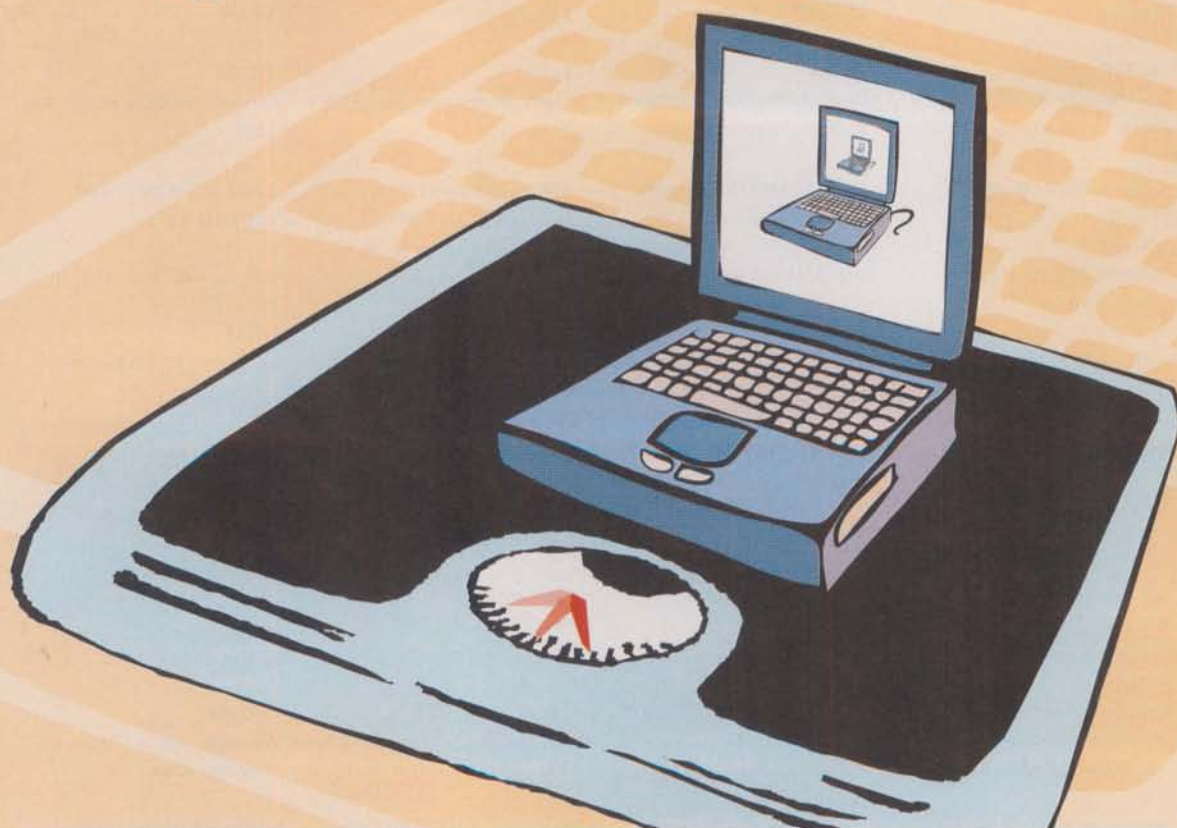


<b>Product</b>	Alpha Computer AlphaServe Dual650	Dell Performance 220	Gateway 7210 Server	NEC Express5800 /L20d
<b>Phone</b>	(03) 9417 9177	1800 292 313	1800 500 742	(02) 9700 5052
<b>Online</b>	http://www.alphacomputer.com.au/	http://www.ap.dell.com/au/	http://www.au.gateway.com/	http://www.necca.com.au/
<b>Price incl tax</b>	\$6,500	\$5,823	\$5,428	\$7,650
<b>Price incl tax for single processor unit only</b>	\$5,770	\$4,403	\$4,654	\$5,388
<b>Processor</b>	Dual Intel Pentium III 650MHz	Dual Intel Pentium III 800MHz	Dual Intel Pentium III 600MHz	Dual Intel Pentium III 600MHz
<b>Secondary cache (K)</b>	256K	256K	256K	256K
<b>Tested/maximum RAM (M) and type</b>	256M SDRAM (4G max)	128M SDRAM (512M max)	128M SDRAM (2G max)	128M SDRAM (4G max)
<b>Hard disk</b>	36G Quantum Atlas 10K Ultra 3 SCSI	10.2G Ultra ATA-66	18G Ultra 2 SCSI (LVD)	18G Ultra 3 SCSI
<b>Hard disk controller</b>	Adaptec AIC 7892 Ultra 160 PCI SCSI	Intel 82801AA BusMaster IDE	Adaptec AIC-7896/AIC-7897 PCI Ultra2 SCSI	Adaptec AIC 7899 Ultra160 PCI SCSI
<b>Hard disk file system</b>	FAT32	FAT32	FAT32	FAT32
<b>Graphics card</b>	ATI 3D Rage Pro	Matrox G400 Max DualHead	Integrated Cirrus Logic CL-5480	Integrated ATI 3D Rage IIC
<b>Video bus type</b>	AGP	AGP	PCI	PCI
<b>Video RAM</b>	8M SDRAM	32M	2M (system memory)	4M (system memory)
<b>Video controller chip</b>	ATI 3D Rage Pro	Matrox G400 Max DualHead	Cirrus Logic CL-5480	ATI 3D Rage IIC
<b>Graphics driver name and version</b>	atimpab.sys 5.00.2180.1	g400m.sys 5.00.2195.1020	cirrus.sys 5.00.2180.1	atiragem.sys 5.00.2180.1
<b>Monitor</b>	Philips 105S 15in	Dell	None	NEC MultiSync V520 15in
<b>Tested resolution/colour depth</b>	1,024 by 768 at 16 bit	1,024 by 768 at 16 bit	1,024 by 768 at 16 bit	1,024 by 768 at 16 bit
<b>CD/DVD-ROM drive</b>	40x CD-ROM	48x CD-ROM	40x CD-ROM	32x CD-ROM
<b>Soundcard</b>	Integrated Intel AC97	Optional	None	Optional
<b>Speakers</b>	None	Integrated 16-bit sound	None	Optional
<b>Modem</b>	None	None	None	Optional
<b>OS available</b>	Windows 95/98/NT/2000 Pro/2000 Server/2000 Advanced	Windows 2000 Professional Server, Linux, Novell NetWare	None (Windows 2000 professional installed for benchmarking)	Windows 2000, Windows NT, NetWare, Linux
<b>Networking adaptors</b>	Integrated 10/100 Ethernet	Integrated 10/100 Ethernet	Integrated 10/100 Ethernet	Integrated 10/100 Ethernet
<b>Warranty</b>	3 years onsite parts and labour	3 years RTB	3 years (1 year onsite, 2 years RTB)	3 years onsite parts and labour
<b>Bundled software and accessories</b>	None	None	HP OpenView ManageX	NEC ESMPro Management software, NEC Express Builder Installation Tool
<b>Benchmark results</b>				
<b>CPUmark 99</b>	57.5	72.7	56.8	57.1
<b>FPU WinMark 99</b>	3,470	4,270	3,210	3,220
<b>Business Disk WinMark 99</b>	7,900	6,150	4,983	6,383
<b>High-End Disk WinMark 99</b>	22,600	15,500	12,067	14,500
<b>Business Graphics WinMark 99</b>	46	305	46	54.1
<b>High-End Graphics WinMark 99</b>	140	572	256	242
<b>Business Winstone 99</b>	31.8	33.6	20.9	22.8
<b>Winstone Dual</b>				
<b>Inspection Winstone</b>	6.08	6.08	5.32	4.64
<b>High-End Microstation</b>	3.57	3.94	3.28	3.32
<b>High-End Photoshop</b>	9.54	5.16	4.13	4.33
<b>High-End Visual C++</b>	9.25	8.6	7.19	8.72
<b>Viewperf AWADVS</b>	6.265	8.88	5.6	4.01
<b>Viewperf DRV</b>	2.464	3.18	2.62	2.27
<b>Viewperf DX</b>	4.85	7.19	4.57	3.54
<b>Viewperf ProCDRS</b>	1.204	7.3	1.13	1.01
<b>SYSmark2000</b>	142	174	118	119



# ULTRAPORTABLE NOTEBOOKS

## Rapid weight loss



We all wish that someone would come up with a light and portable notebook that doesn't cut back on either power or performance. Could such a thing already exist? **Darren Ellis** and **Fiona Williams** investigate whether ultraportables are really all style and no substance.

Anyone who has ever lugged a notebook from one side of an airport terminal to the other will readily tell you, as useful as they are when travelling or out of the office, notebooks are *heavy*. A basic notebook tips the scales at 4kg. A powerful battery and standard attachments only add to the burden and translate into tired shoulders at the end of a busy day.

Until recently, the only lightweight alternative to a cumbersome notebook was a large screen PDA or subnotebook. However, these devices only run scaled-down versions of popular programs and have only a fraction of the power and performance of a weighty notebook. This means that many people end up sacrific-

ing performance for portability, and using a device that falls short of their requirements. For the weary road warrior who demands more of their notebook and less luggage weight, the promise of an ultralight notebook may seem too good to be true.

Most major brands now offer ultraportables in their range of notebooks, and the notable exceptions are due to release their own versions in the coming months.

The guidelines for inclusion in the APC review were simple: notebooks had to be under 2kg, excluding optional extras such as docking stations and/or port replicators.

A common feature of the ultraportable notebooks on the market is a slim magne-

sium alloy casing in the always-popular metallic finish. This is as much for appearance's sake as for lightness. Quite simply, they look good and travel well.

But an eye-catching notebook counts for little if the battery life is shorter than the average domestic flight. There is not much use in buying an ultraportable if it's useless when you can't reach a power point. This was a major area of concern for APC, as we suspected that if something had to be sacrificed to reduce the weight, it would surely be the hefty battery.

APC tested the current range of ultraportables on the market to determine whether they are a worthy alternative to a chunky notebook or just a high-tech fashion accessory.



## Acer TravelMate 340T

Considering the 2kg weight limit for submissions to this review, Acer's TravelMate 340T was a pleasant surprise. It's the largest notebook in this roundup. Usually smaller is better in notebook reviews, but when looking at ultraportables under 2kg, larger models can have certain advantages.

The TravelMate's size makes it's exceptionally comfortable for typing, with plenty of room for resting your wrists. The most notable advantage is it's 12.1in TFT screen, but the Trident Cyber9525DVD graphics chip is only capable of supporting a maximum resolution of 800 by 600 at 16-bit colour. This is a restriction you might expect from the IBM ThinkPad 240 with its 10.2in screen, but not the TravelMate. It's a shame the resolution is so low on a machine that has a DVD-ROM. Even the maximum external resolution is restricted to 800 by 600 at 16 bits.

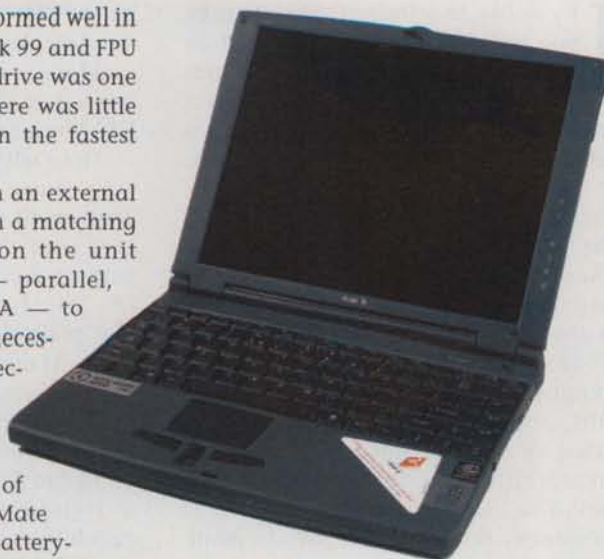
The notebook rated well in the tests, run at the lower resolution. Its 450MHz Pentium III processor ranked second only to the Compaq Armada M300's

500MHz Pentium III. It performed well in both the Ziff-Davis CPUmark 99 and FPU WinMark 99. The 6G hard drive was one of the slower drives, but there was little difference in speed between the fastest and slowest.

The unit also comes with an external floppy/DVD combination in a matching finish. Expansion ports on the unit include enough options — parallel, serial, USB, PS/2 and VGA — to make a port replicator unnecessary. There are also connections for the inbuilt 56K modem and 10/100 Ethernet adaptor.

Acer claims a battery life of three hours for the TravelMate 340T, but in the Ziff-Davis BatteryMark test, it only lasted for a little over two hours. This was typical of the range of ultraportables APC tested, and in most cases this would provide just enough juice for a presentation. For longer hauls, you might want to invest in a second battery.

**Darren Ellis**



**Contact**  
**Phone**  
**Online**  
**Price**  
**In short**

Acer  
1300 366 567  
<http://www.acer.com.au/>  
\$5,399  
An expensive device, but it has a lot of good features.

## Compaq Armada M300

The Compaq Armada M300 certainly meets all the requirements of an ultraportable. It is slim and lightweight and boasts a Pentium III 500MHz processor. And it looks pretty snazzy to boot. That's the good news. The bad news is it won't get you far without needing to recharge the battery.

It fell short of the two-hour mark in the Ziff-Davis BatteryMark, and only had a total operating time of one hour and 47 minutes. This limitation won't impress people who don't have an extension cord at their disposal when the battery inevitably gives up in the middle of a presentation.

However, those who have the foresight to pack an additional battery will reap the many benefits the Armada M300 has to offer. After a lacklustre performance in the battery tests, the Armada redeemed itself by outperforming the other contenders in the majority of benchmarks. In the Ziff-Davis CPUmark 99, the powerful processor ensured that the notebook came out on top with a score of 47; this is considerably higher than its closest rival, the Acer TravelMate, which scored 39.2. It also blitzed the field in the FPU WinMark processor test with a score of 2,670, far ahead of the TravelMate (which scored 2,410) in second place. The Armada proved itself useful for business applications, scoring the best in the Business Win-

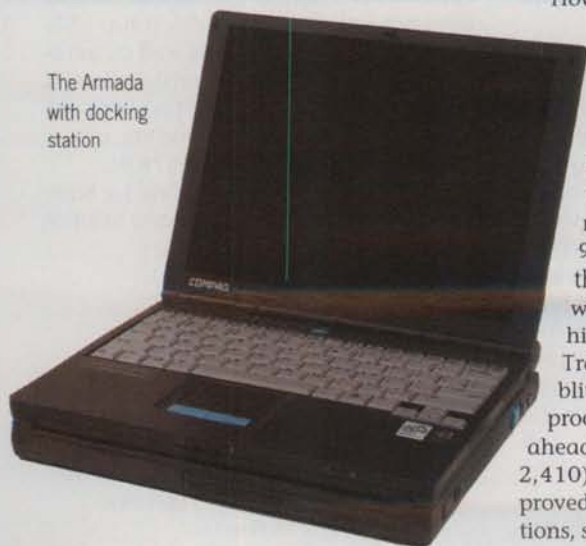
stone benchmark. However, aside from the poor showing in the battery test, the High-End Disk WinMark benchmark proved to be the Armada M300's weakest results — it came last.

The Armada has a good range of features, including USB port, a single Type II PC Card slot and an internal 56K modem. However, if you want either a CD-ROM or DVD-ROM, you have to purchase a mobile expansion unit (MEU docking station, \$595), which attaches to the base of the notebook. You would also want to purchase an additional battery. These extra costs push the price up, but would be necessary to get optimum performance from the Armada M300.

**Fiona Williams**

**Contact**  
**Phone**  
**Online**  
**Price**  
**In short**

Compaq Australia  
1300 368 369  
<http://www.compaq.com.au/>  
\$4,416  
Poor battery life lets down an otherwise excellent ultraportable.



The Armada with docking station



## Dell Latitude LS

If you like to attract envious glances, you will be tempted by the sleek design and silver finish of the Latitude LS. The dimensions are similar to those of the Acer TravelMate 340T, but Dell has managed to produce a lighter notebook. It weighs just 1.58kg. As with the NEC Versa Lite FX and Acer TravelMate 340T, the Dell Latitude LS has a 12.1in display. The display is clear and easy on the eyes, and the Dell's generously sized keyboard is also pleasant to use.

This unit has the usual array of expansion ports: parallel, PS/2, mini DIN, audio in/out and USB. Dell also offers an optional Advanced Port Replicator which snaps on to the back of the unit. This only provides a couple of extra expansion slots to those already available on the notebook, and is unnecessary, particularly at a price of \$314.

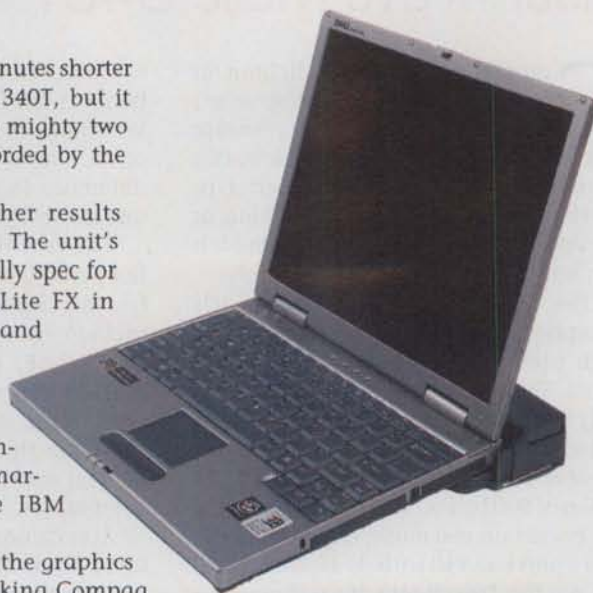
The notebook fared reasonably well in the benchmark tests. Its best result came in the Ziff-Davis High-End Disk WinMark 99, where it came second to the NEC Versa Lite. This result highlights the 6G drive's efficiency with complicated functions. The

battery life was only four minutes shorter than the Acer TravelMate 340T, but it could not contend with the mighty two hours and 50 minutes recorded by the NEC Versa Lite FX.

The Dell Latitude's other results were consistently average. The unit's Pentium III 400 ran virtually spec for spec with the NEC Versa Lite FX in both of the CPUmark 99 and FPU WinMark 99 tests. The poorest result for the Dell Latitude LS was in the Business Graphics WinMark 99, where it scored marginally better than the IBM ThinkPad 240.

It clearly does not have the graphics capabilities of the top-ranking Compaq Armada M300. The Dell Latitude LS was also beaten by the Compaq Armada M3000 in business applications. Several improvements would need to be made before the Dell Latitude LS can justify its price and be considered a must-have business notebook.

**Fiona Williams**



**Contact**  
**Phone**  
**Online**  
**Price**  
**In short**

Dell  
1800 800 312  
<http://www.dell.com.au/>  
\$5,768  
A middle-of-the-range notebook with a top-of-the-range price tag.

## IBM ThinkPad 240

If price is your main consideration when choosing an ultraportable, you will be hard pressed to beat the IBM ThinkPad 240. At under \$3,000, it is by far the cheap-

est of all the notebooks APC tested. The ThinkPad 240 was also one of the most comfortable to use, due to its almost full-sized keyboard and large display. However, price is one thing and performance is another. When you look at the IBM's performance, it becomes evident that it's a case of getting what you pay for.

The IBM ThinkPad 240 had a good showing in the SYSmark2000 aggregate test, scoring the best result of 109. However, underwhelming performances were recorded in all other benchmarks. The worst result was in the BatteryMark 3.0 test. The ThinkPad 240 came last, giving up the ghost only one hour and 40 minutes into the test. The highest performer (NEC Versa Lite) ran for a further hour and 10 minutes. The Celeron 300 processor did not fare very well in either of the Ziff-Davis CPUmark 99 or FPU WinMark 99 tests, placing last and second last respectively. Graphics programs are clearly not

the ThinkPad 240's specialty either; it had the lowest Business Graphics WinMark 99 score, just 36 compared to the top score of 150 by the Compaq Armada M300. The High-End Graphics WinMark 99 could not be run at all.

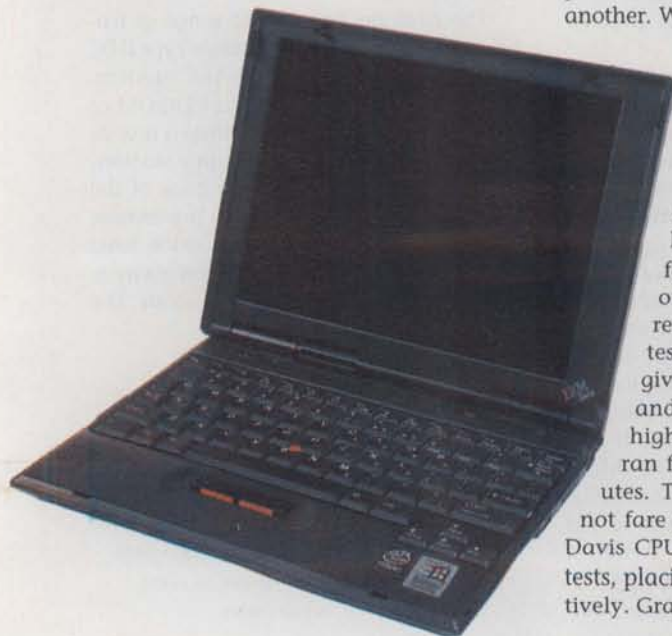
Despite the less than impressive benchmark results, the ThinkPad 240 does not scrimp on features. It has USB, parallel and serial ports as well as infrared and audio in/out expansion slots. A CD-ROM drive is not shipped with the basic model, but is available as an optional extra at a cost of \$278.95.

If you only need a notebook for basic tasks when away from your home or office PC, the IBM would do the trick.

**Fiona Williams**

**Contact**  
**Phone**  
**Online**  
**Price**  
**In short**

IBM  
13 24 26  
<http://www.ibm.com.au/>  
\$2,940  
The cheapest ultraportable reviewed, but it performed poorly and has a short battery life.





# Smarter.

Includes:

WebWorks 2000  
internet toolkit

100 FREE  
internet hours

BONUS  
headset



The sleek new SwannSmart II has arrived.

The SwannSmart II retains the technology that won the SwannSmart modem the Australian PC Users Magazine Best Buy 1999 Award.

Cool colour and hot performance, the SwannSmart II offers consistently stable performance and excellent throughput on all line conditions.

Swann's WebWorks 2000 is the toolkit to get you online fast. With utilities, applications, tutorials, and information, it will help you get the most out of your time online.

Available at all major retailers.

# SWANNSMART II V.90 EXTERNAL MODEM



## NEC Versa Lite FX

The Versa Lite FX is an eye-catching notebook with an attractive silver finish on the top of the casing. Even the battery coordinates with the look; it snaps on at the back, under the notebook, which also helps to tilt the notebook up slightly for easier typing. It's slim and stylish, with some extremely good features. It has a matching external floppy drive and a remarkable 24x CD-ROM drive. It's the smallest and slimmest external drive APC has ever seen; rather than having a conventional sliding tray, it has a clamshell design.

In order to submit the Versa Lite FX for the APC Ultraportable review, NEC provided a pre-production model containing a Pentium III 400MHz processor. However, the notebook is only available for sale as a Pentium III 500 or Celeron 400. The price stated is for the Pentium 500 model.

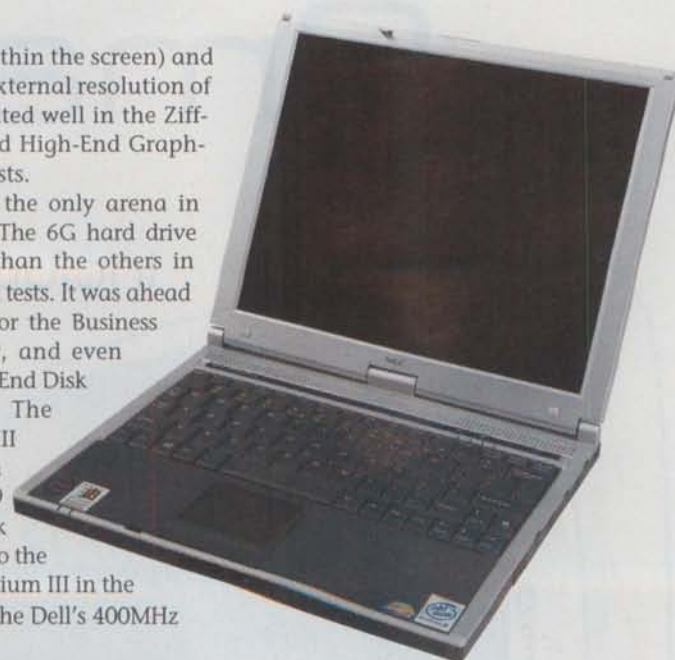
Like the Dell Latitude LS and the Acer TravelMate 340T, the NEC Versa Lite FX has a large 12.1 in TFT display. Its Silicon Motion LynxEM graphics chip is capable of an internal resolution of 800 by 600 at 16-bit colour (it can run at higher rates,

but it doesn't fit within the screen) and has a maximum external resolution of 1,024 by 768. It rated well in the Ziff-Davis Business and High-End Graphics WinMark 99 tests.

Graphics wasn't the only arena in which it excelled. The 6G hard drive was much faster than the others in both Ziff-Davis disk tests. It was ahead by a big margin for the Business Disk WinMark 99, and even higher in the High-End Disk WinMark 99 test. The 400MHz Pentium III CPU fared well in the CPUmark 99 and FPU WinMark 99 tests compared to the faster 450MHz Pentium III in the Acer and equal to the Dell's 400MHz Pentium III.

The best result by far was in the BatteryMark 3.0 test. The NEC battery time was the longest of all notebooks reviewed. At two hours and 50 minutes, it lasted 40 minutes longer than its closest rival, the TravelMate 340T.

**Darren Ellis**



**Contact**  
**Phone**  
**Online**  
**Price**  
**In short**

NEC  
1800 632 777  
<http://www.necca.com.au/>  
\$5,949  
Good design and great performance.

## Panasonic Toughbook CF-34

As ultralight notebooks go, the Panasonic Toughbook CF-34 is by far the most interesting. It has remarkable features, which for some people may justify the hefty price tag of \$6,995. Designed for the active and intrepid road warrior, the Toughbook CF-34 is designed to protect

itself from anything even the clumsiest of users can throw at it, drop on it or spill on it. It features a magnesium casing, shock-mounted hard drive, anti-reflection and water-resistant touchscreen LCD, as well as a water-resistant keyboard and touchpad. If your travels see you working in overly wet, rocky or unstable conditions, the Toughbook CF-34 is probably more prepared and better equipped than you could ever hope to be. All this in a notebook that weighs only 1.7kg.

As you might expect, the rugged nature of the Toughbook CF-34 is its best selling point. However, the benchmarks were run on the lesser Windows 95 platform and are not necessarily a true reflection of its performance against the other notebooks reviewed. Even accounting for this disadvantage, the Toughbook CF-34 scored quite erratically in the APC Labs tests. The best result was in the Ziff-Davis CPUmark 99 test, where it came equal second with the Acer TravelMate. It came third in the FPU WinMark 99 processor test, slightly better than both the NEC Versa Lite and Dell Latitude LS.

The Toughbook's worst result was in the High-End Disk WinMark 99; it produced the lowest score, well behind the closest contender, the Compaq Armada M300. As for battery life, the unit barely made it to 2.5 hours, falling well short of the 4.5 hours boasted by the manufacturer.

Although the Toughbook CF-34 can be used virtually anywhere, its small dimensions are a definite disadvantage. Lean and nimble fingers won't have a problem using the tiny keyboard, but not everyone in the target markets of emergency service and construction workers has petite hands. There are larger (but heavier) notebooks in the Toughbook range, which would better suit these users.

**Fiona Williams**

**Contact**  
**Phone**  
**Online**  
**Price**  
**In short**

Panasonic  
13 26 00  
<http://www.panasonic.com.au/>  
\$6,995  
Tough as nails, but too tiny for many people to use comfortably.





## Specifications and results: Ultraportable notebooks

Product	Acer TravelMate 340T	Compaq Armada M300	Dell Latitude LS	IBM ThinkPad 240	NEC Versa Lite FX	Panasonic Toughbook
Contact	Acer	Compaq	Dell	IBM	NEC	Panasonic
Phone number	1300 366 567	1300 368 369	1800 800 312	13 24 26	1800 632 777	13 26 00
Online	<a href="http://www.acer.com.au/">http://www.acer.com.au/</a>	<a href="http://www.compaq.com.au/">http://www.compaq.com.au/</a>	<a href="http://www.dell.com.au/">http://www.dell.com.au/</a>	<a href="http://www.ibm.com.au/">http://www.ibm.com.au/</a>	<a href="http://www.necca.com.au/">http://www.necca.com.au/</a>	<a href="http://www.panasonic.com.au/">http://www.panasonic.com.au/</a>
Price	\$5,399	\$4,416	\$5,768	\$2,940	\$5,949	\$6,995
Warranty	1 year limited onsite (guaranteed 2-hour repair time)	1 year limited onsite	3 years limited onsite	1 year limited RTB	1 year RTB	3 years limited RTB
<b>Specifications</b>						
Processor	Pentium III 450	Pentium III 500	Pentium III 400	Celeron 300	Pentium III 500	Celeron 300
Secondary cache (K)	256K	256K	256K	128K	256K	128K
RAM and type (maximum RAM)	64M SDRAM (256M max)	64M SDRAM (320M max)	64M SDRAM (128M max)	64M SDRAM (192M max)	64M SDRAM (192M max)	64M SDRAM (192M max)
Hard disk drive and type	6G EIDE	6.4G EIDE	6G Ultra EIDE	6.4G EIDE	6G EIDE/UDMA	4.3G EIDE
Hard disk controller	Intel 82731AB/EB PCI bus master	Intel 82731AB/EB PCI bus master	Intel 82371AB/EB PCI bus master	Intel 82371AB/EB Smart EIDE	Intel 82731AB/EB PCI bus master	Intel 82731AB/EB PCI bus master
Hard disk file system	FAT32	FAT32	FAT32	FAT32	FAT32	FAT32
Video bus type	PCI	PCI	PCI	PCI	AGP	100M AGP
Video RAM	2.5M SDRAM	4M SGRAM	2.5M VRAM	2M VRAM	4M SDRAM	4M SDRAM
Video controller chip	Trident Cyber 3D graphics accelerator	ATI Rage LT Pro	NeoMagic MagicMedia 256AV	Rage LT Pro	Silicon Motion SM710 Lynx EM	NeoMagic MagicMedia 256AV
Pointer device	Glidepad	Glidepad	Glidepad	Trackpoint and glidepad	Glidepad	Glidepad
Dimensions (h by w by d, in cm)	2.35 by 28.9 by 21.8	2.3 by 26.4 by 22.9	2.5 by 27.2 by 21.9	2.6 by 26 by 20.2	2.4 by 22.4 by 28.3	4.3 by 22.9 by 18.8
Bare minimum weight	1.8kg	1.44kg	1.58kg	1.32kg	1.54kg	1.7kg
Travel weight	2.3kg	3.22 kg	2.28 kg	1.73 kg	2.1kg	2.1 kg
PC Card slot type	Type II	One Type I	One Type I	One Type I	2 Type II or 1Type III	Type II
Port replicator available	No	No	Yes, \$312	No	No	Yes, \$549
Docking station available	No	Yes, \$595	No	No	No	No
CD-ROM drive /DVD-ROM	2x DVD-ROM (external)	Optional CD-ROM (available in docking station)	24x CD-ROM (external)	Optional CD-ROM (external)	24x CD-ROM (external)	Optional CD-ROM (external)
Soundcard	ES1946 PCI (Solo 1E)	ESS ES1946S (Solo 1E)	NeoMagic MagicMedia 256 Audio	Not specified (Sound Blaster Pro compatible)	ESS ES1946S (Solo 1E)	AC 97 2.1 compatible
Internal modem	56K internal	56K internal	56K internal	56K internal	56K internal	56K internal
Display	12.1in TFT	11.3in TFT	12.1in TFT	10.4in TFT	12.1in TFT	8.4in anti-reflection touch screen
Maximum internal resolution	800 by 600	800 by 600	800 by 600	800 by 600	800 by 600	800 by 600
Maximum external resolution	800 by 600	800 by 600	800 by 600	1,024 by 768	1,024 by 768	1,024 by 768
Battery type and rated battery life	Lithium ion/3 hours	Lithium ion/2 hours	Lithium ion/not specified	Lithium ion/3.5 hours	Lithium ion/2.5 hours	Lithium ion/4.5 hours
OS available	Windows 98	Windows 95/98, Windows NT 4.0	Windows 95/98, Windows NT 4.0	Windows 98	Windows 98SE	Windows 95/98, Windows NT, Windows 2000
Expansion slots	Easylink combination IDE, parallel, serial, IR, external SVGA, PS/2, audio in/out	Parallel, serial, audio in/out, RJ-11, RJ-45, IR, USB	Parallel, PS/2, mini DIN, audio in/out, USB	Parallel, serial, USB, audio in/out, IR, keyboard/mouse /numpad	Three USB, video, audio in/out, IR, two PCMCIA, external CD-ROM connector, external FDD connector	Serial, USB, PCMCIA, RJ 45, audio in/out



## Specifications and results: Ultraportable notebooks (continued)

CF-34Product	Acer TravelMate 340T	Compaq Armada M300	Dell Latitude LS	IBM ThinkPad 240	NEC Versa Lite FX	Panasonic Toughbook CF-34
Carry case included in price	Yes	No	No	No	Yes	No
Benchmark results						
CPUmark99	39.2	47	38.4	27.5	38.2	39.1
FPU WinMark 99	2,410	2,670	2,130	1,930	2,130	2,220
Business Disk WinMark 99	1,996	2,226	2,040	1,940	2,620	Could not run
High-End Disk WinMark 99	6,590	5,340	7,030	6,840	8,263	3,871
Business Graphics WinMark 99	110	150	35.7	36	71.1	32.4
High-end Graphics WinMark 99	Could not run	423	222	Could not run	354	Could not run
Business Winstone 99	17	20	13.7	12.8	16.4	14
BatteryMark 3.0 Battery rundown time	2:08	1:47	2:04	1:40	2:50	2:29
SYSMark2000	81	94	90	109	79	Could not run

The products used in these tests are shipping versions available to the public at the time of publication unless otherwise stated. All specifications details are submitted by distributors and APC accepts no responsibility for any errors within.

Winstone, WinBench and associated products are registered trademarks of the Ziff-Davis Publishing Company.

These tests were performed without independent verification by Ziff-Davis and Ziff-Davis makes no representations as to the results.

To test the battery APM was enabled on all notebooks. All power-saving features were disabled.

Notebooks require an internal resolution of 1,024 by 768 to run these tests.

### Editor's Choice



#### NEC Versa Lite FX

#### Highly Commended

#### Dell Latitude LS

The NEC performed strongly across the board. The processor holds its own against more powerful opponents; this is an amazing achievement considering that the retail version will have an even faster processor than the preproduction model reviewed here (the price given is for the 500MHz system). The battery life is also excellent. As it proved itself a worthy lightweight alternative to a cumbersome notebook, APC considered it a deserving winner of the Editor's Choice award.

The sleek-looking Dell Latitude LS is also a sound investment. It performed impressively in the tests and has a long battery life to keep you working between power points.

### How we tested

To test the performance of the notebooks submitted for review, APC Labs used the Ziff-Davis Winstone 99 and WinBench 99 suite of benchmark software plus SYSMark2000 from MadOnion.

**Winstone 99** runs a suite of modern business and graphics applications. These applications are timed to measure how long the notebook takes to complete these tasks. The Business Winstone 99 result is a comparative score of how fast the notebook completed the various business applications.

**WinBench 99** contains a set of tests, each designed to find out how fast each component of a notebook really is.

**Business and High-End Graphics WinMark 99** measures the notebook's graphics performance when performing video tasks associated with common business applications, as well as demanding multimedia and 3D applications.

**Business and High-End Disk WinMark 99** provides a measure of how

a notebook's hard disk subsystem handles a load equivalent to that demanded by the business applications used in the Business Winstone 99 test.

**CPUmark 99** measures the speed of the processor, memory and cache subsystem.

**FPU WinMark 99** is a 32-bit floating point processor test.

**SYSMark2000** is similar to Winstone 99 in that it runs a suite of business applications for both Internet Content Creation and Business Productivity. We have listed the SYSMark2000 aggregate score.

These tests were performed without independent verification by Ziff-Davis, and Ziff-Davis makes no representation or warranties as to the results. WinBench is a registered trademark of the Ziff-Davis Publishing Company.

The Panasonic Toughbook was tested under Windows 95, and the Acer TravelMate and IBM ThinkPad were both tested at a resolution of 800 by 600.

Readers should check current pricing and specifications with distributors.





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**\$5450**

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1 x Intel Pentium III 667MHz  
Cube Server Case, 300W P/S  
128Mb ECC SDRAM  
9Gb U/2 LVD SCSI 7200RPM  
Dual Ultra/2 LVD SCSI Controller  
Diamond A55 4Mb 2/3D AGP  
3.5" Floppy, MS Win NT Server  
15" Philips Monitor, 0.28  
40x SCSI CD-ROM, 3D Sound  
Intel 10/100Mb Fast Ethernet  
Keyboard & Mouse



## Server-5

**\$4850**

Tyan USA, Trinity-400 Single M/B  
1 x Intel Pentium III 600MHz  
19" Rackmount Case, 300W P/S  
128Mb ECC SDRAM  
9Gb Ultra160 SCSI 7200RPM  
Adaptec 29160 Ultra160 SCSI  
Diamond A55 4Mb 2/3D AGP  
3.5" Floppy, MS Win NT Server  
15" Philips Monitor, 0.28  
40x IDE CD-ROM, 56K Modem  
Accon 10/100Mb Fast Ethernet  
Keyboard & Mouse



**Ultra  
160 SCSI**

## Server-6

**\$5190**

Tyan USA, Tiger-133 M/B - Dual Processor capable  
1 x Intel Pentium III 550MHz  
Redundant Server, 2 x 300W P/S  
128Mb ECC SDRAM  
18Gb Ultra160 SCSI 7200RPM  
Adaptec 29160 Ultra160 SCSI  
Diamond A55 4Mb 2/3D AGP  
3.5" Floppy, MS Win NT Server  
15" Philips Monitor, 0.28  
40x IDE CD-ROM, 56K Modem  
3Com 10/100Mb Fast Ethernet  
Keyboard & Mouse



**Ultra  
160 SCSI**

## Server-7

**\$11400**

Tyan USA, Thunder-2500, Dual Processor capable  
2 x Intel Pentium III 800MHz  
Redundant Server, 2 x 300W P/S  
256Mb ECC SDRAM (UP TO 4Gb)  
2 x 18Gb U/2 LVD SCSI 7200RPM  
Dual Ultra/2 LVD SCSI Controller  
Diamond A55 4Mb 2/3D AGP  
3.5" Floppy, MS Win NT Server  
15" Philips Monitor, 0.28  
40x SCSI CD-ROM, 3D Sound  
Intel 10/100Mb Fast Ethernet  
Keyboard & Mouse



## P-20

**\$2450**

Tyan USA, Trinity-400 M/B  
Intel Pentium III 600MHz  
64Mb PC133 SDRAM  
13Gb Ultra/66, 5400RPM HDD  
AGP 4x Riva TNT-2 M64 32Mb  
3.5" Floppy, MS Windows98 SE  
17" Philips Monitor, 56K Modem  
40x CD-ROM, 3D Speakers  
Creative Vibra PCI-128 Sound  
Keyboard & Mouse



**Blue Black Red Green Purple**  
choose your colour case

## A-20

**\$4290**

Tyan USA, Trinity-K7 M/B  
AMD Athlon 900MHz  
128Mb PC133 SDRAM  
20Gb Ultra/66, 7200RPM HDD  
AGP 4x GeForce DDR 32Mb  
3.5" Floppy, MS Windows98 SE  
17" Philips Monitor, 56K Modem  
10x DVD-ROM & S/W Decoder  
3D Sound & 280W Subwoofer  
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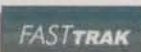
## Hard Disk Controller

Ultra66 \$ 85  
FastTrak-66 RAID \$225  
Side Pro Raid66 \$190  
SB-40 UW SCSI \$150  
SB-80 LVD SCSI \$350

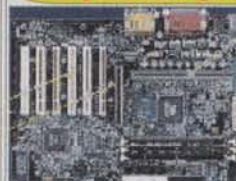
## Hard Disk Drives

WD 13.6GB/5400 \$285  
WD 13.6GB/7200 \$315  
WD 15.3GB/7200 \$330  
WD 20.5GB/7200 \$395  
WD 27.3GB/7200 \$540

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## Tyan Trinity K7 - S2380

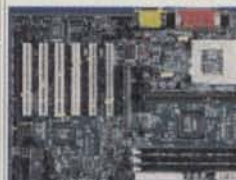


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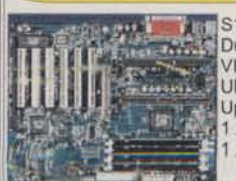
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Performance



S1854S  
Slot1, FlipChip, Celeron  
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Ultra DMA66  
VIA PRO 133AChipset  
Up to 768MB SDRAM  
1xAGP, 6xPCI, 1xISA

**\$Call**

## Dual Tyan Tiger-133 ( 1834 )



S1834  
Dual Slot1  
VIA PRO 133A Chipset  
Up to 800MHz+  
Up to 1GB SDRAM  
1 x AGP, 6x PCI  
1 x ISA

**\$TBA**

## Dual Tyan Thunder 2400 ( 2257 )



S2257, Dual, Slot1  
Intel840 Chipset  
Up to 2GB SDRAM  
Ultra2 LVD support  
up to 800MHz+  
Creative Sound 1373  
Ultra DMA 66  
Intel Lan 10/100Mbps

**\$Call**

## Dual Tyan Thunder 2500 ( 1867 )



S1867DLUAN  
Dual Slot1  
Serverset III HE  
Chipset  
Dual Ultra2 LVD  
Intel NIC 82559  
Up to 4GB SDRAM  
1 x AGP Slot  
5 x PCI (64-bit) Slots  
1 x ISA Slot

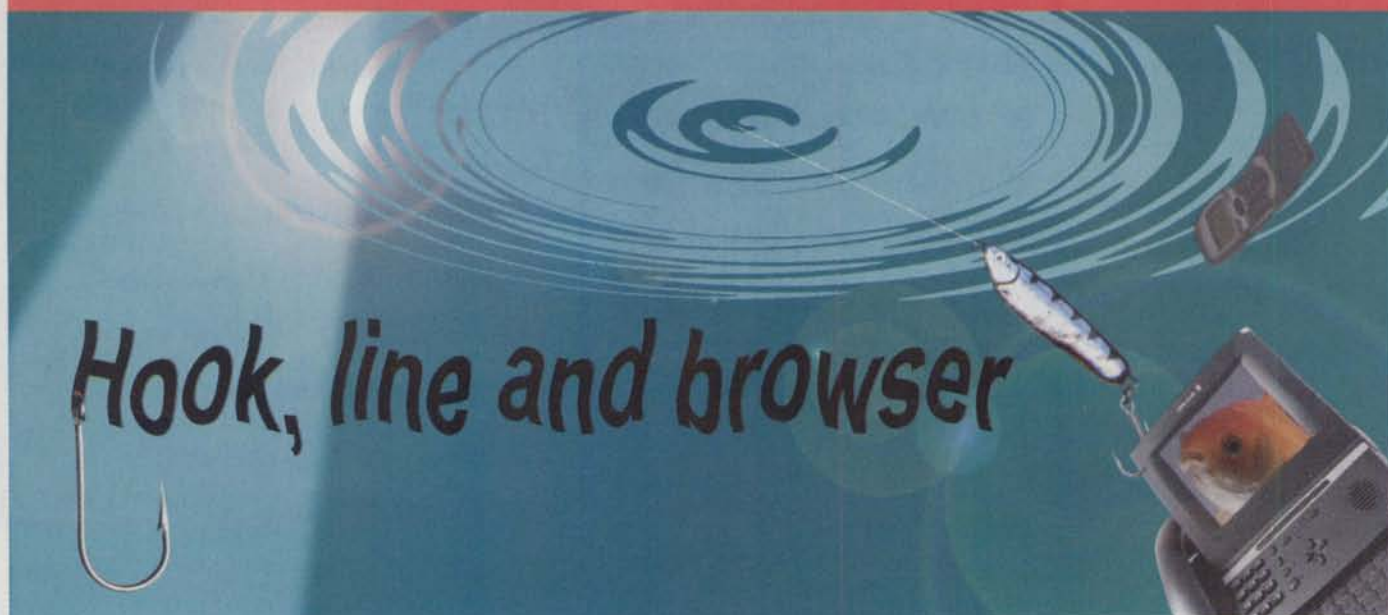
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# NET APPLIANCES



## Hook, line and browser

Web-enabled toasters may not be available yet, but as the diversity of Internet appliances grows, consumers are facing a bewildering array of choices. **Alex Kidman** checks out the first models to hit the Australian market.

Until now, Internet access has been the domain of computers. Net access is becoming much more of a consumer commodity, and there's now a push to use something other than PCs to access the Internet. The argument is that consumers don't want to have to learn about an operating system just to be able to connect and interact with the Net.

This is where the non-PC Internet appliance comes in. They may be a little thin on the ground at the moment, but the future looks promising; a recent IDC report predicts that some 89 million Internet appliances will be sold annually by 2004. What kinds of Internet appliances are available locally at the moment, and what will they cost you? APC examined six different appliances, ranging from mobile phones to set-top boxes.

### Anyway, anyhow, anywhere

The idea of Internet appliances is certainly appealing. Why not read the news headlines on your mobile phone while you're waiting for a train, or check your email while you're chopping up the vegetables. It's unlikely that these devices will completely replace PCs as a means of connecting to the Net; for a start, most of them do not have much in the way of storage capacity.

In some ways, these new devices can't compete with PCs. The beauty of accessing

the Internet from a PC is the PC's flexibility. Connection methods and Web standards have developed to the point that you can simply plug in a new card or download the relevant software onto your PC and you're away. With a dedicated unit, however, the specifications of your device are set in stone.

The market for such devices may be growing, but they're still expensive compared to a simple modem. The cost rises further if you have to replace the whole device to take advantage of new features.

If your PC modem explodes, you can always buy another one. Blow up the modem in some of these devices, and you're up for a new appliance. The problem is worse if you want more than text browsing; very few of the devices APC looked at could make much of a stab at multimedia beyond displaying images, quite often as completely separate downloads.

The other issue is the cost of access. Some of the units APC looked at are ISP-specific. These units either require some form of server-end processing (as with the iPhone) so that only compliant ISPs can be used, or they are subject to a deal with a specific ISP, such as Sega's Dreamcast, which is tied to Big Pond. Mobile devices are even more complicated, because the calls are time-charged. WAP (Wireless Application Protocol) access may also incur a charge. At the time of testing, Telstra and Optus were still offering WAP services free of charge (aside from the basic

mobile access charges), but it seems unlikely that they'll stay free.

### Simple or stupid?

The big selling point for a lot of these devices is that they will be easier to use than a PC. There are no operating systems to learn, no modem initialisation strings, and no complex browsers. The reality is a little different; these devices are generally only easier to use in some respects. The interfaces may be easier, but often that means they are harder to modify, or cannot render with frames or other special formatting. Connecting to the Net may be easier, but you may have limited choices for access and content. Internet appliances are becoming more sophisticated, but they still have some ground to cover before they become a threat to the PC.

Recent Palm and Windows CE devices have also allowed Net browsing, primarily through the use of IR modems or PC Card modems connected to mobiles. The strong market penetration of these devices means they represent a serious challenge to other mobile Internet devices. Why pay \$600 for a WAP phone when you can spend \$200 on an IR modem for your existing Palm, and have a larger screen and more functions? APC recently reviewed PDAs (see APC January, page 80), so they are not covered here, but they are certainly another non-PC category on the rise.



## Ericsson iPhone

If you're not going to go mobile (as with the Nokia 9110 or the Ericsson MC218), you can still use a phone to access the Net. The Ericsson iPhone.

APC has reviewed the iPhone before (see APC October 1999, page 42). At the time, the concept impressed us, but its implementation didn't — specifically the poor screen sensitivity and the lack of some telephone features such as an answering machine. Both of these problems have been addressed in this version of the iPhone.

The iPhone is a Commander-size phone with quite a large screen, from which various phone and Internet functions can be accessed. The last time APC looked at the iPhone, we abandoned its stylus in favour of a finger. This led to some finger smearing on the screen, but it was the only way to reliably navigate the iPhone. The new iPhone is much better in this regard. Its screen is highly responsive, making the stylus quite reliable.

As far as Net access goes, not much has changed. It still has a greyscale screen,



which has its drawbacks, but it should be noted that the resolution and onscreen rendering are still well ahead of any of the mobile phone options we investigated. It's also important to keep in mind that the iPhone uses a single phone line, so while it's possible to view the Hoyts Web page for screening times, you'll need to disconnect

to phone the cinema. Modem specs have been updated since our first look, with the iPhone running off a 56K modem. Again, content needed to be stripped of colour at the server end, which led to some interesting speed experiences. Larger images, oddly enough, seemed faster to load than smaller ones. We tested it using Connect's iPhone portal. Plans are also available from Planet Internet, and the distributor hoped to have more iPhone-compliant ISPs soon. Both ISPs offer unlimited access plans, but Planet Internet's \$24.95 a month plan undercuts Connect by \$5.

A better screen and better features, along with competitive access rates, certainly make the iPhone an attractive option. However, as a non-mobile device with a high price tag, it may be a hard sell.

<b>Contact</b>	iPhone Australia
<b>Phone</b>	(02) 9328 0866
<b>Online</b>	<a href="http://www.iphone.com.au/">http://www.iphone.com.au/</a>
<b>Price</b>	\$899
<b>In short</b>	The iPhone keeps getting better, but it may be difficult to sell it to the PC crowd.

## Ericsson MC218

The MC218 occupies an odd market position. It clearly challenges the Palm, Psion, and Windows CE handheld devices with its basic PDA applications, but its Internet functions are designed specifically to work with Ericsson mobile phones, which limits its overall appeal. It seems unlikely that it would sell to anyone who doesn't already own an Ericsson mobile.

The unit has a clamshell design and runs on two AA batteries. It has the largest screen of all the mobile products APC looked at. The screen can be set to display Web pages in either four or 16 shades of grey; it's faster with four, but graphics-heavy pages displayed better in 16 greys, especially in bright light where the screen tends to reflect too much. The keyboard is quite small, and requires single finger typing.

Connecting the MC218 to the Internet was a little tricky. The setup for entering details was pretty simple, but for some reason the system decided that the default IR modem speed should be a blistering 115Kbps, much faster than it can handle. It was only after it was throttled back to

19Kbps that a stable connection was established. The IR connection was also a little flaky. The manual suggests a distance of no greater than a metre, but our tests found that a proximity of 10 to 20cm was necessary. To begin a connection, both units needed to be stable and directly facing each other, which is hardly ideal for a 'mobile' product.

The MC218 supports both HTML and WAP browsing, which is useful, but there's not much WAP content available yet. The MC218 browser handled frame resolution well, choosing whether to display frames, list them or ignore them altogether. One function it lacks is the option to wrap text. All too often, a line went off the page, which is irritating when reading long documents where you have to scroll far too frequently.

Images can be loaded separately, or not at all, which certainly accelerates

browsing at these speeds. The MC218 struggled a touch with animated GIFs; some of them loaded but stay still, while others refused to appear at all.

One other pitfall with the MC218 is that when you close the Internet application, it doesn't send an end call signal to the phone, so you must remember to manually hang it up as well, or you'll have some nasty phone bills at the end of the month.



<b>Contact</b>	Ericsson
<b>Phone</b>	(02) 9367 4999
<b>Online</b>	<a href="http://www.ericsson.com.au/">http://www.ericsson.com.au/</a>
<b>Price</b>	\$1,299
<b>In short</b>	An acceptable handheld Internet appliance, but its close ties to Ericsson may be a problem for some users.



## Nokia 7110

One piece of hardware that a lot of people already use, and which comes with its own inbuilt network connectivity, is a mobile phone.

Most mobile phones that can access Net services use what is known as WAP (Wireless Application Protocol). WAP is more tolerant of sketchy connections, and is specifically designed for small screen displays because it is intended for displaying text. There's a wide variety of WAP phones available from a range of manufacturers.

The WAP-compliant phone APC looked at was the Nokia 7110, connected to Telstra's MobileNet service. Nokia officials claim that this phone is better suited to WAP functions than any other on the market, a claim based primarily on its larger screen and the presence of a scroll wheel Nokia calls the Navi Roller. The Navi Roller can be used to scroll through lists and then pushed in to make a selection.



Two more buttons sit above the roller and perform other functions. A single roller for all access is fine for short access periods, but for long WAP sessions, it becomes tiresome and limiting. The onscreen display isn't large (this is a regular sized mobile phone, after all) but is quite clear. Selectable regions of text are highlighted as the navi-roller moves over them.

Connecting to Telstra's WAP service was relatively painless, but APC was disappointed by the connection quality and the content on offer. There were a lot of links from the telstra.com portal that

referred to services that were yet to be launched, and we kept getting discon-

nected from the service. This appeared to be more the fault of the the network than of the phone.

The 7110 also has most other functions you would expect to find in a mobile phone, including SMS, onscreen games and personal address/phone books. It also has a 'shutter' to protect the phone buttons. This has a fiddly release catch, and we found it much easier to simply slide it down manually.

WAP has some major players behind it and is a technology that will receive a significant push in the near future. The content should soon pick up to match current expectations of what an Internet access device can do. The technology's here; all we have to do is wait for something to do with it.

<b>Contact</b>	Nokia
<b>Phone</b>	1300 366 733
<b>Online</b>	<a href="http://www.nokia.com/">http://www.nokia.com/</a>
<b>Price</b>	\$949
<b>In short</b>	A good phone, which is let down by a lack of available WAP content.

## Nokia 9110 Communicator

Nokia was the first to market an Internet appliance: the original Nokia Communicator 9000. A few years on, and the basic design has been improved a little. The unit is smaller and it now has competitors in the mobile Internet arena.

By mobile phone standards, the 9110 is huge; it is a third larger than the comparable 7110. There are two reasons for this: it has a relatively large screen and a full QWERTY keyboard. The 9110 offers the usual simple PDA options (address books, calendar/appointments) as well as fax, SMS and Internet capabilities.

Unlike a WAP phone, you're not tied to a WAP provider — the 9110 can be configured to use a regular ISP, and access most standard Web pages. We tested the 9110 using OzEmail, and found that browsing wasn't spectacularly easy, but it was acceptable. By default, the 9110 doesn't load images, which accelerates access considerably. Images can be clicked onto for loading, and the results were surprisingly good. We checked the **NewsWire** site and we could bring up the button icons and clearly discern text within the

images themselves. The 9110 can't render frames, and instead brings up a simple text option list which allows you to select frames to view. It's not exactly navigation-friendly, but on the plus side, it allows you to completely bypass many banner ads.

You navigate using the keyboard, which is very small. Single-digit typing is all that's possible, and you need to be ready to delete a lot, as mistakes (especially if you have large fingers) are common. Page navigation is handled through the cursor keys, and the other browser functions (back, forward, open new page) are handled by specific buttons on the side of the display.

A numerical progress meter runs while items are downloading. This gives a good indication of when to expect pages to finish loading. It is limited to 9,600bps, but with most images ignored, the speed is acceptable. You can't browse every site with it — imagemaps, for example, are impossible — but it's quite good for news Web sites or any text-heavy site.



The 9110's other advantage is its ability to link to a PC, either by IR or serial connection. The supplied software isn't exactly exciting, but it does work for file transfers and printing.

<b>Contact</b>	Nokia
<b>Phone</b>	1300 366 733
<b>Online</b>	<a href="http://www.nokia.com/">http://www.nokia.com/</a>
<b>Price</b>	\$1,999
<b>In short</b>	A bulky phone, but it has superior Net access to the majority of current WAP devices.



## Sega Dreamcast

Much of the hype surrounding Sega's Dreamcast console centred on the fact that it came with a modem and had the potential for Internet access. Australians have had to wait longer than the rest of the world for this, because the Dreamcast was only launched here late last year, and its online service didn't follow for three months after that.

Setting up the Dreamcast for Net access is relatively painless. The manual suggests that the Dreamkey software will automatically connect to Big Pond (the approved Dreamcast ISP) on first launch, but you have to go through a couple of screens before this happens. Telstra is treating the Dreamcast as if it is just another PC, so all of its relevant plans are on offer (see *APC* April, page 115, for a detailed review of Big Pond's pricing and services).

Interestingly, the same company that makes the software for the Set Top Surfer also supplies the browser for the Dreamcast. A little more work has gone into the Dreamcast browser; text and images are clearer, and the interface is easier to work with. Mind you, it needs to be,

because it's designed to be navigated with a game controller.

Controlling browsing with a games controller is odd at first, but it's not too hard to get used to. Text entry, however, is quite difficult. An onscreen keyboard allows you to enter text, but it's just too slow. Anyone seriously considering text entry would need to pay extra for a keyboard.

The browser is configurable, and settings such as default scrolling and cookie acceptance can be altered. The default font is unattractive, but it does render clearly onscreen.

The other factor in the Dreamcast's favour is the possibility of online gaming. So far Sega has only released one online-compatible title, the oddly titled *Chu Chu Rocket* (due in Australia mid-May), but conversions of games like *Half-Life* are promised for later in the year.

*APC* encountered some minor problems playing sound files. Occasionally when the

Dreamcast loaded a file, there was no sound. Sega is about to launch version 2.0 of its software in the US, and hopefully will fix problems like this, but no local release date has been set.

Annoyingly, the Dreamcast only ships with a 33.6Kbps modem in Australia, whereas in the UK and US it comes with a 56K modem. However, it can be replaced with a newer and faster modem when available.

The Dreamcast is a reasonable Internet access option, and with a games machine thrown in, it's an attractive package.



<b>Contact</b>	OziSoft
<b>Phone</b>	(02) 9317 0000
<b>Online</b>	<a href="http://www.dreamcast.com.au/">http://www.dreamcast.com.au/</a>
<b>Price</b>	\$499; keyboard \$69.95
<b>In short</b>	A handy Internet access device, but you'll need a keyboard to avoid RSI.

## Spirit Set Top Surfer

There has been a concerted effort to move Net surfing onto TV sets. Microsoft has ploughed millions of dollars into its WebTV service in the US, and some pundits believe the future of the Net is as a set-top box. The Spirit Set Top Surfer, however, shows that there's still some way to go to rival the experience of surfing the Net with a PC.

The Set Top Surfer consists of a set-top box for access, and an infra-red keyboard. There's obviously been some thought put into the set-top box and the place it will play in an overall TV setup, because it can act as a passthrough box for other TV and video devices. It supports video in and out, and it has a coaxial and S-Video-out slot. Unless you're desperate, steer clear of the coaxial connection, as the text quality is poor.

The keyboard has a standard design, but it has extra buttons and a trackpoint-style 'button' mouse controller on the top right-hand side. The IR receiver on the set-top box was responsive. The keyboard layout was OK, but the menu and mouse select buttons on the right-hand side are a little too close together. This created prob-



lems when we tested it, as we kept accidentally pressing two buttons at once.

The manual claims you need no knowledge of the Net to set it up, but there are a few steps that can trip you up, such as DNS settings and proxies. It may also be difficult to convince your ISP to support a set-top box.

The Set Top Surfer delivers good images to a television. It was necessary to limit border size, as almost every page we looked at rendered wider than the screen

size. You can browse to limit this, but it's still annoying. Even more annoying was the unit's tendency to freeze, especially when an option box was onscreen. On those occasions, the only way to unfreeze it was to turn the unit off and restart. However, the 56K modem was quick to respond and connect.

Its keyboard has a series of function buttons for things like search utilities, as does the home page that loads whenever the unit is switched on. There is a useful button (or screen) selection for TV listings.

This device doesn't compare very favourably to the Dreamcast. Its browser software is similar to that of the Dreamcast, but it's inferior. The Set Top Surfer has less features than the Dreamcast and costs \$200 more.

<b>Contact</b>	Mike Boorne Electronics
<b>Phone</b>	(02) 9906 6666
<b>Online</b>	<a href="http://www.spiritmodems.com.au/">http://www.spiritmodems.com.au/</a>
<b>Price</b>	\$699
<b>In short</b>	Fast surfing, but it will struggle to compete with the Dreamcast.





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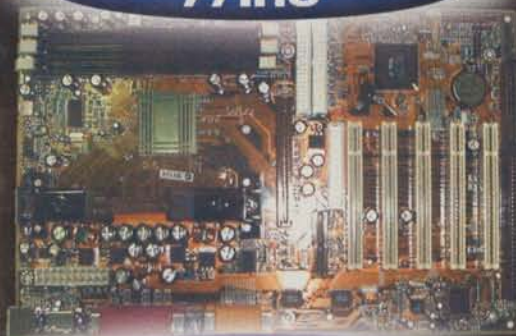
## 993AN/AS



### 993 AN/AS

- VIA 82C693A Chipset, Twin CPU Sockets
- Magic Install
- Ultra DMA 66
- 4 Channels Speaker
- PC Health Monitoring
- 133 MHz Front Side Bus
- Optical Kit Connector (optional)

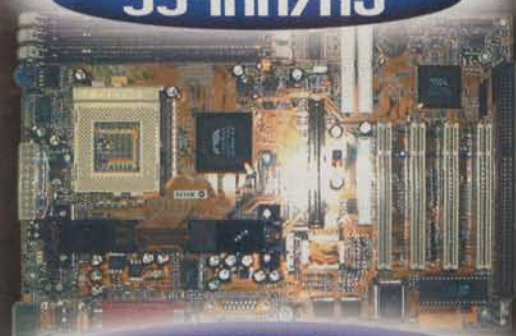
## 771AS



### 771 AS

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- Support AMD Athlon (K7) 550-800
- 3 DIMM socket
- AMR slot
- Magic Install
- AGP 4X Mode
- Ultra DMA 66
- On-board 3D Audio
- PC Health Monitoring

## 994AN/AS



### 994 AN

- VIA 694X Chipset. Twin CPU Sockets
- Magic Install
- 4X AGP Mode
- 4 Channels Speaker (For 994AS/994AS-L only)
- Optical Kit Connector (Optional)
- Ultra DMA 66
- PC Health Monitoring
- 133MHz Front Side Bus

## 920BF



### 920 BF

- Support twin CPU Sockets
- SiS 620/5595 Chipset
- Magic Install
- Ultra DMA 66 On-board
- 3D AGP VGA 4 Channels Speaker
- PC Health Monitoring

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## Keep in touch

Welcome to another edition of Workshop. APC recently celebrated its 20th anniversary, and Workshop is one of the few sections of the magazine to have endured throughout those two decades, both in name and content. This is as much due to you, the readers who have conquered programming the VCR and have gone on to fearlessly tackle tracts of code, as to the talented team of writers who have held the section together over the years.

Workshop cannot exist in a vacuum; we need to hear your feedback so we can continue to provide you with the most practical, relevant and up-to-date information possible. We would like to see more of you visiting our online forums and sharing your thoughts with APC and your fellow readers. If you have a DIY disaster story, we'd like to hear it; if there's something you're curious about we'd like to know.

To make sure your Workshop experience is as hands-on as possible, drop the APC cover CD into your tray and check out the Workshop section. It contains all the

sample files mentioned throughout Workshop and a selection of shareware that has been tested and reviewed by APC's experts. You'll find a summary of this shareware at the end of each OS column.

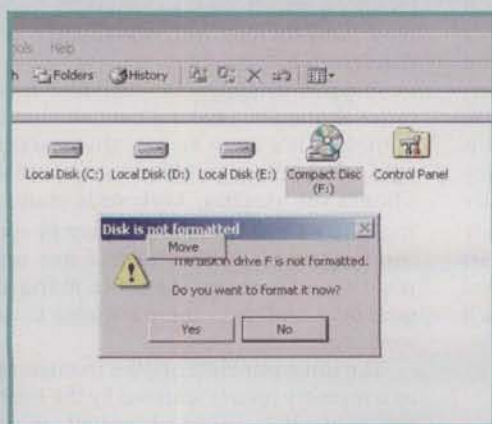
While you're browsing the CD, you'll come across an enormous range of the latest shareware and freeware, freshly plucked from the Web by APC's CD team. For a complete listing of CD contents, turn to page 8.

**Andrew Colley, Workshop coordinator**

**Workshop is a reader-input section. Please send your ideas, comments or criticisms to [workshop@acptech.net](mailto:workshop@acptech.net), or to our snail mail address APC Workshop, PO Box 4088, Sydney NSW 1028. Alternatively, you can join one of the online discussion forums at [apcmag.com](http://apcmag.com) to raise technical issues with fellow DIY enthusiasts or voice your opinion on any topic featured in Workshop. A full archive of Workshop articles can be found at <http://apcmag.com/workshop/>.**

## Bug of the month

Who said that Microsoft doesn't want to bring us new innovations? (Well, besides the US DOJ, anyway). This month's bug-spotter, Michael Fyffe, has uncovered an unexpected feature in Windows 2000: the ability to format a CD in a (read-only) CD-ROM drive. I'm impressed!



## Win! Win! Win!

Workshop is always on the lookout for the most interesting, strange, funny or downright weird software bugs you can find. These include code snippets, features that function poorly, or things that crash a particular application. Anything and everything buggy deserves mention.

Send us your favourite bug via email to [bugs@acptech.net](mailto:bugs@acptech.net) or snail mail to APC Bug of the Month, PO Box 4088, Sydney NSW 1028, and you'll be in the running to win a software prize. Please send screen captures, example code listings or detailed instructions to trigger a bug in an application, as appropriate for your entry.

The winner's name, along with details of the bug, will appear in this column in APC's August issue. So start hunting!

**Michael Smith**

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For many people, more memory simply means a faster system, but there's more to it than that. **By Alex Kidman**

# Technobabble

**S**o, you have a system with 128M of RAM, or maybe it has 256K onboard cache memory. Feeling good, huh? Well, what does it all actually mean?

Over the past few months, Technobabble has looked at what makes a computer a computer: the ability to compute through binary code, the composition of silicon circuitry, and the microprocessors. Now it's time to move on to memory.

Your computer is a just a pointless bit of circuitry if it can't do anything with the masses of data that it processes; it needs to be able to pick that data up and put it down somewhere. This includes data that needs to be picked up and put down very quickly as it's being worked on. Technically speaking, 'memory' can be used to describe any computer storage function, from the smallest amount of internal memory to a massive external drive capable of holding millions of bits. However, there are two important differentiating factors.

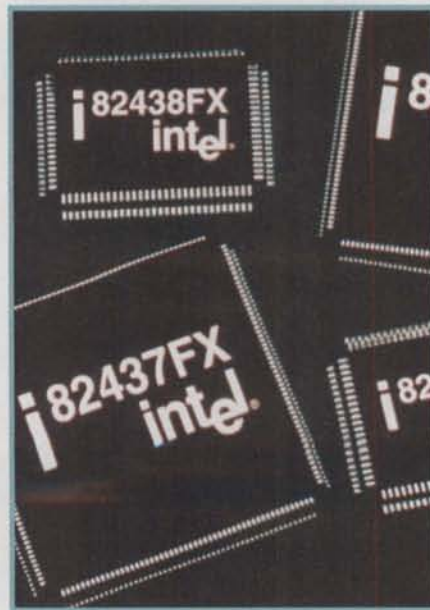
## Memory

Memory storage can be in the form of either electromagnetic movement and recording (your hard drive) or electrical storage (system memory or RAM). Writing to system memory is much faster than writing to your hard disk. When you write to a hard disk, a disk head has to move over the platter, parts clunk, and data is retrieved — this takes time. When you write to solid-state memory, your computer is simply charging a memory location; the data is written and presented to the user instantly (well, in nanoseconds).

Why don't we all have computers with several gigabytes of solid-state memory? The answer is cost. If it was used in these quantities it would be incredibly expensive; it would eclipse the cost of the rest your system. It's much more sensible and economical to delegate the mass storage requirements of the computer to cheaper and slower storage systems, such as hard drives and Zip disks, and keep just enough system memory for the data required to run applications. A forthcoming Technobabble column will look at long-term storage memory devices.

## Addresses

All the concepts generally attached to storage translate to the computing world: you need somewhere to put your stuff and you need some sort of convention for finding it later (just as, for example, your socks go in the top drawer and so on). Computer memory organises its data using addresses that are usually expressed in hexadecimal notation. The maximum number of addresses you can have depends on your operating system and hardware. For instance, a 32-bit system can address just over 4 billion unique bytes of data.



Each address contains a single byte of data. For the address, you start with 0 as your first memory address, and move on to the logical limit of addresses determined by the amount of memory you have and the system. In some cases, it is possible to go beyond that limit, and some memory technologies purposefully exploit nonexistent memory for a variety of purposes. This does, of course, have its problems, and the main one is that if you look for an address that isn't there, you'll crash your system.

## Old addresses

One of the design limitations of the original 8086 was the amount of memory it

was capable of addressing. Each address space takes up one byte of memory, and the 8086's original specifications only provided for 1M of memory. To make matters worse, only 640K of that could be directly addressed by DOS programs.

Unless you have an esoteric interest in old DOS software, these issues have not been relevant since the 386 generation. The theoretical limit on memory addressing has been expanded to about 4G, as a result of 32-bit addressing. That's an awful lot of memory, and should serve computing needs for quite some time.

## Refreshing addresses

From a physical standpoint, one byte of memory is represented by eight bits. Each bit, in turn, is represented by a charge (for 1), or absence of a charge (for 0). Semiconductors aren't very good at retaining charges and the charge eventually leaks away from most types of memory. A constant refreshing charge is sent through memory circuitry to ensure that memory contents stay accurate — at least as long as the power keeps flowing.

The method for refreshing charges is quite nifty. When memory is read (for instance, to recall something you've just cut from a document), the contents of the memory at that address are refreshed in the process; by sending a pulse to check an address, the charge is effectively 'topped up' and the memory continues to serve its purpose. You need to ensure that locations which aren't constantly being read (and thereby recharged) don't lose their charge.

A good analogy for this is a busy office manager. Looking over a mass of cubicles, it's easy to see the workers beavering away at their jobs — their phones are ringing, keyboards chattering and so on. It's equally easy to spot the lazy workers: they're inactive and nodding off to sleep. The office manager goes over and gives them a nudge to get working.

The same principle applies in memory: as a memory area is scanned by the memory controller, areas identified as not being read are given an electrical kick to ensure that their contents don't fade





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away. All of this takes place extremely quickly — the memory contents are refreshed, re-read and moved on at an incredible pace.

## ROM versus RAM

There are two different types of computer memory: one you can write to many times, the other you can write to only once. Memory that can only be written to once is known as ROM, or read-only memory (also known as non-volatile memory). Once a data pattern is burnt to ROM, it can be read as many times as required, but it cannot be written over.

The primary use for ROM is core program details, such as the system BIOS of a PC that sets up basic operating parameters. Most handheld PCs store the entire OS in ROM because they're more prone to power failures and hence can't afford to rely on it for memory. In the event of a battery failure, you only need to replace or recharge the batteries and the system returns to its former state.

What happens if you have ROM that you do want to write to — for instance, to implement a new feature or fix an existing bug? If you have an extremely old machine, there's nothing that can be done. However, most machines built in the last five years use a slightly modified ROM design philosophy that allows for writing to a ROM under certain special conditions.

The first generation of rewritable ROMs were known as EPROMs (erasable programmable read-only memory). The memory state in an EPROM could be wiped by applying a burst of ultraviolet light to a small panel, usually found on the top of the ROM chip.

This was a good solution, but it did have one problem: if the circuit was accidentally exposed to UV light (for instance, a nice bright sunbeam), then the chip could be wiped inadvertently. Building in the technology for EPROMs wasn't cheap either. The technology required to shine UV light onto them and reprogram them added to the cost and they were bulky.

The next generation of reprogrammable ROMs (and the ones used for most new system BIOS ROMs) are EEPROMs (electrically erasable programmable read-only memory). EEPROM uses an electrical charge to erase the ROM package, so there's less chance of errors occurring. If you've ever had to upgrade your system's BIOS by running a software patch over it, you've used EEPROM.

The other advantage of EEPROM over EPROM is that it can be rewritten byte by byte. When you shine a light on EPROM, the entire chip is clear and must be rewritten; EEPROM can simply erase and rewrite the portions as required. For example, if a system BIOS didn't properly support a particular piece of hardware, and only four bytes of its software needed to be rewritten, you could recode those four bytes selectively on an EEPROM chip.

## ROM is RAM and RAM is RAM too

The other type of memory is RAM (random access memory). As the name implies, random access memory gives the system access to non-contiguous memory sections at will, accelerating processing operations considerably. However, the name is a little deceptive, because all modern ROM uses random access as well. Only ancient systems have sequential access ROM chips — certainly a very small proportion of systems still in use today.

Still, anything that is referred to as RAM is usually rewritable and electrically volatile, meaning it can only hold its state as long as there is power present; if the power goes, so do the contents of the memory. Your system uses a number of different types of RAM. Some of these are discussed below and the rest of them will be described in next month's Technobabble.

## Cache memory

Your processor needs a vital piece of information — perhaps the code to run Windows, or that animated GIF you made in your spare time. The CPU checks system memory locations in a specific order. First it checks the memory cache. Modern CPUs carry a certain amount of memory on the CPU itself for fast checking, known as the memory cache. For example, a new 1GHz processor has 256K of onboard cache.

Cache memory is a variety of RAM called SRAM or static RAM. Static RAM doesn't require a specific memory refresh circuit — it'll keep its contents without the need to monitor and refresh constantly, as long it receives power. It's also quite fast, and given its position relative to the CPU, it's easy to access. However, part of its speed advantage comes from the fact that it is kept relatively small.

## Cache levels and memory checking priority

In order to understand why cache memory is relatively small, it's necessary to explain the procedure that your system undertakes to find information. Imagine you have a graphics application that needs to find the animated GIF mentioned earlier. It sends the request to the CPU, which then begins searching for it.

It looks in the cache first. The cache is split into what are known as two levels: level one cache, which sits directly on the processor, and level two cache, which sits just outside it. Obviously, the closer the memory is to the CPU, the faster the retrieval time. If it isn't in the on-chip cache — the search is very fast because the cache itself is small — then the level two cache is queried. If it still isn't found, the CPU then queries external memory. If that fails, then it checks the hard drive (and any other relevant external sources, such as your CD-ROM drive).

Once the data it is retrieved, it is stored in memory for speedier access in the future. Of course, you only have a limited memory capacity, and it will be quickly pushed out if other, more vital data is being processed.

What does this have to do with small cache sizes? If the cache is massive, then searching it will take longer, and if the data isn't in there, your system will slow down as it proceeds to check the secondary cache, then memory, then hard drives. These fruitless searches often lead back to the slowest data sources anyway, so having a larger cache simply prolongs the period that the system is busy.

The other reason that cache memory isn't large is much simpler: cost. Producing a complex SRAM circuit is much more expensive than conventional memory. An SRAM circuit has more capacitors to facilitate quick data retrieval, and the cost of the extra capacitors would drive CPU prices out of consumer reach.

Next month Technobabble explores the mysteries of RAM and its many acronyms. Asynchronous or synchronous? Just what is SDRAM and RDRAM? What role does speed play in memory? How much is enough? And we examine alternative memory technologies and virtual memory in the second part of our series on memory.

Alex Kidman can be contacted at [alexk@acptech.net](mailto:alexk@acptech.net). For a complete archive of APC Technobabble columns, see <http://apcmag.com/babble/>.



# MicroGram Computers

## PCI Plug & Play Printer / Serial Cards



Available in either 1, or 2 port versions, these PCI bus PnP bi-directional parallel ports have an 32 byte FIFO buffer. Support is provided for DOS, Win 95 & NT. Also available, are single, dual, 4 & 8 port PCI PnP serial cards.

Cat. 2618	1 Port Printer PCI	\$79
Cat. 2687	1 Port Printer ECP/EPP/SPP PCI	\$83
Cat. 2619	2 Port Printer PCI	\$119
Cat. 2688	2 Port Printer ECP/EPP/SPP PCI	\$125
Cat. 2620	Serial/Parallel 2S/1P PCI	\$119
Cat. 2616	1 Port RS232 16550 PCI	\$69
Cat. 2617	2 Port RS232 16550 PCI	\$99
Cat. 2674	4 Port RS232 16550 PCI	\$439
Cat. 2678	8 Port RS232 16550 PCI	\$669

## USB Active Extension Cable

Extend the distance between your PC & USB peripherals with this 4.8m long cable which includes an active amplifier to boost the signal level. It operates in accordance with USB Specification Ver 1.1 at 12Mb/Sec. Up to 5 cables can connect in series for extensions to 24m.



Cat. 9115	USB Active Extension Cable	\$74
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## VGA Monitor Splitters



Splitter modules enable up to 8 monitors to simultaneously share the information of a host computer. The ideal way of providing multiple displays in training

rooms, airports, stock rooms, clubs, etc.

Cat. 3070	Two Output	\$269
Cat. 3055	Four Output	\$336
Cat. 3056	Eight Output	\$574

## Diagnostic Cards

Just plug into a vacant PCI slot and turn on the computer. A LED display shows a numeric error code indicating the area of the fault. By checking the error code against the appropriate BIOS listing, the type of fault can be identified. The errorcode messages for AMI BIOS, PHOENIX BIOS and AWARD BIOS are listed in the manual. An ISA card is also available.



Cat. 3422	Diagnostic Card - PCI	\$89
Cat. 3128	Diagnostic Card - ISA	\$69

## Multi I/O ISA Card

A versatile interface card that supports 2 FDD, 2 HDD As well as 2 16550 compatible serial ports, 1 ECP/EPP printer port and 1 games port.

Cat. 2055	Multi I/O Card	\$50
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Cat. 8903	Point-of-Sale GST Bundle - Digitill/Attache	\$869
Cat. 8902	Point-of-Sale GST Bundle - QuickPOS	\$869

### POS Customer Display

This POS customer display is driven from the serial port and has a vacuum fluorescent display with two lines of 20 characters. It is ergonomically designed with a 270 degree viewing angle. Choice of 11.25mm or 9mm high character display.



Cat. 8728	POS Customer Display (Pictured)	\$379
Cat. 8907	POS Customer Display	\$339

### POS Cash Drawers & Citizen Printers



Compact Citizen docket printers are ideally suited to compliment these POS cash drawers which feature robust metal construction

casing and a pearl white ABS fascia with a slip deposit slot. The bill tray has adjustable dividers for 4 or 5 compartments along with spring loaded bill clips. A separate coin tray has adjustable dividers for up to nine compartments. The printers feature 3 lines/sec, friction feed with 250 bytes input buffer, metal tear bar, 2 colour printing, paper end sensor & automatic paper load.

Cat. 8897	POS Cash Drawer - Epson/Star /Citizen	\$195
Cat. 8898	POS Cash Drawer - RS232	\$249
Cat. 5667	Citizen IDP460 Parallel Printer	\$420
Cat. 5668	Citizen ISP460 Serial Printer	\$420

### Compact Keyboard

When desk space is at a premium an 80 key keyboard with full 101 key functionality will come in handy. It has dimensions of only 297(W) x 152(L) x 30(D) mm.

Cat. 8403	Compact 80 Key PS/2	\$73
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### Omni-Directional Laser Scanner



An affordable, vertically mounted, Omni-Directional laser scanner, which is ideally suited to reading bar coded products at supermarket checkouts. Depth of field is 300mm.

Cat. 8521	Bar Code Laser Omni-Direct. KB Wedge	\$1599
Cat. 8573	Bar Code Laser Omni-Direct. Serial	\$1699

### Magnetic Card Reader - KB Wedge

A bi-directional magnetic stripe reader for credit authorization terminals, POS terminals, PC's & banking terminals. Features easy keyboard wedge installation & requires no software modification, programming of I/O devices or additional power.



Cat. 8045	MCR - Track 2 KB Wedge	\$349
Cat. 8681	MCR - Track 2 KB Wedge PS/2	\$399
Cat. 8418	MCR - Track 2 Serial	\$449
Cat. 8417	MCR - Track 1 & 2 KB Wedge	\$439
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## Understanding CISC, RISC and VLIW architectures and clock speeds. By Nathan Taylor

# Core

In last month's Technobabble column, APC briefly touched on the subject of processor architecture and its effect on CPU performance. This month, Core takes a closer look at the differences between CISC, RISC and VLIW architectures, examining the design approaches behind them and precisely how they affect clock speed and performance.

## CISC

At one time, all processors were what we now call CISC, or complex instruction set computers. The term itself was invented retroactively in response to the invention of the RISC (reduced instruction set computer) processor, to distinguish that architecture from the new design. Retrospectively, the x86 series of processors can be considered CISC processors, as can the Motorola 68K processors and the Digital VAX.

The dearth of data storage capabilities in early computers demanded that programs be as compact as possible; to achieve that, programmers needed to be able to avoid spelling out complex functions stage by stage. The solution: design processors with the ability to directly execute complex functions at hardware level — the larger the hardware-based instruction set, the more concisely programs could be written.

However, adding new hardware circuits to a CISC processor to accommodate each new addition to the instruction set proved impractical. The processor designers of the time needed some way of taking complex instructions and converting them into instructions for which there are physical circuits. Typically, a CISC processor achieves this by translating higher-level instructions into hardware-level instructions using microcode. Microcode is a chunk of software embedded in the processor containing tables of routines for it. Take this very basic example: imagine that you have a processor which only contains an adder circuit, but it's called upon to perform a multiplication operation. The microcode would contain software instructions that would allow the processor to emulate a multiplication circuit by performing an accumulate loop.

By contrast, a classic RISC processor would leave it to the software level to per-

form the discrete additions and emulate the multiplication.

## RISC

RISC processors, first introduced to mainstream computing over a decade ago, evolved out of the realisation that CISC architecture had passed its prime and needed a replacement. It became apparent that many instructions on CISC processors were hardly ever used, wasting valuable transistors. Furthermore, storage and memory had become cheap enough to undermine the need for CISC architecture at all.

The design solution offered in RISC architecture was simple: strip all the complex, under-used instructions from the CPU, and leave it to the compiler to deal with complicated instructions. Sure, program code would now need to be a bit bulkier, but RISC processors would be easier to design and they would run faster because processing would no longer require the microcode interpretation layer.



Intel's Pentium processor. The x86 processors are considered to be the last bastion of CISC in wide deployment.

Theoretically, because they don't need to execute the variety of instructions that CISC processors do, RISC processors should require less transistors. However, any saving at this level is often more than offset by the fact that RISC processors require additional transistors to support large register sets and caches to buffer the high volume of data and instructions that are thrown at them. A Hewlett-Packard engineer once described a particular Hewlett-Packard RISC processor as a "level 2 cache with incidental processor", because far more transistors were devoted to the cache than the actual processor.

Sun is considered to be the pioneer of the RISC, even though IBM started working on the design during a period that predated the existence of Sun. Now many manufacturers follow RISC design philosophy; products like Compaq's Alpha, the IBM/Motorola PowerPC, HP's PA-RISC and ARM processors all share the RISC class with Sun's Sparc. Many embedded processors also adhere to the RISC design.

There are no hard and fast rules about what differentiates a RISC processor from a CISC processor. The best argument revolves around the role of microcode, but even that brushes over some grey areas.

In the modern era, it is more useful to think about RISC and CISC as design strategies rather than as inflexible product blueprints. The reality is that modern RISC design philosophy frequently produces more complex processors than CISC, which runs counter to common perceptions. By the same token, processors that have the CISC branding attached frequently incorporate RISC-like features. Indeed, the Pentium III and Athlon processors are essentially RISC designs with a CISC interpreter attached to the front.

## VLIW and EPIC

Most modern processors are *superscalar*, meaning they have several discrete subprocessing units capable of executing instructions in parallel (think of it as having multiple processors on the one chip, where the chip itself takes care of divvying up the instructions). RISC processors, with their lower transistor counts, were the first chips capable of superscalar operations (the exception being that every x86 since the release of the Pentium has been superscalar).

Very long instruction word (VLIW) designs take RISC a step further, allowing software code to explicitly specify what each functional unit of the processor is doing. An individual instruction in a VLIW system is actually a bundle of instructions dealing with the various parts of the processor.

VLIW has not had a huge presence so far, partly because it is difficult to develop for. More significantly, the instruction set has to be tightly coupled with the actual



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With the Pentium II and beyond, Intel started incorporating more RISC-like features into its range. It will soon release its VLIW processor, the Itanium.

hardware, which doesn't leave a lot of room for software migration (ie. software written for VLIW will be difficult to port to other platforms because it will be so specific to the hardware), increasing developer reluctance. It has had some success in embedded systems.

EPIC, the architecture used in Intel's upcoming Itanium (formerly known as Merced) and McKinley processors, is an advanced VLIW design. In addition to instructions being bundled, packets of instructions can be chained via a template field included in the instruction bundle, which indicates dependencies between instructions. Theoretically, a chain can be infinitely long. The advantage of this is that it allows software to be ported across future generations of products. For instance, a chain containing 12 instructions could be applied to a processor with six execution units, which retires them in two clock cycles. **A future processor could have 12 execution units, and retire them all in one cycle.**

## Clock speeds

Although clock speeds and architectures are often linked, there's little that differentiates CISC from RISC processors in terms of clock rate. Clock speeds are more a function of a CPU's design and manufacture rather than the instruction set it uses. It's true that many RISC processors run at lower clock speeds than CISC systems, but that has little to do with their RISC-ness; it has more to do with the length of the processor pipeline and the manufacturing technology they use.

At this point, it's worth explaining pipelining a little. Pipelining occurs when a process is done in multiple stages; rather than processing a single object at a time, multiple objects can be in the pipeline at the various stages. Think of it as a factory production line, where each product goes through a set of modifications before the

final product is spat out the end. It wouldn't make sense to wait for the first product to finish before another was started; you can have multiple products at different stages in the production line.

From a CPU developer's point of view, pipelining is a very useful tool. It allows a high throughput of instructions because the processor is effectively working on many instructions simultaneously. It also has other advantages, mostly relating to clock speed. The less you do in a given clock cycle, the higher the clock rate. Pipelining allows processors to break instruction execution down into smaller chunks without a huge penalty, resulting in a lower work requirement at each stage.

Intel's upcoming processor, the Willamette, can reach immensely high clock speeds; Intel has already demonstrated it at 1.5GHz. It can achieve these speeds because it has a many-stage pipeline (consisting of about 20 stages). Compare this to something like the PowerPC processor, which has about six stages, and struggles to make a third of that clock speed.

Why doesn't every processor have very long pipelines? There are two answers. The first is that the longer the pipeline, the greater the latency between an instruction being started and the result coming out the other side (although this is partially compensated for by higher clock speeds). Although the pipelining means that instruction throughput is high, latency is also very high. The second and bigger problem, however, is that a stall or problem in the pipeline (such as a mispredicted branch) costs a lot of clock cycles, as the pipeline has to be flushed and restarted. A stall in a 20-stage pipeline will cost at least 20 clock cycles before another instruction can make its way to retirement — that's large enough to stall a system temporarily.

The other big determinant of processor speed is the manufacturing technology used to develop the chip. The smaller the design rules, the less distance electrons have to travel, and the faster an instruction can be executed. As a rule, a processor manufactured on a 0.18-micron process will be able to achieve higher clock speeds than a processor printed by a 0.25-micron process. Other elements can also influence clock speeds. For instance, copper interconnects between transistors and layers (such as those developed by IBM) are less resistive than aluminium ones, so the electrons travel more easily through the processor and the clock speed can be increased.

Finally, you might have wondered what differentiates a 600MHz Pentium III manufactured at 0.25 micron and an

800MHz Pentium III manufactured at 0.25 micron. The answer is: not much. The 800MHz processors just got lucky. They are manufactured on the same lines, then Intel (or another manufacturer) tests wafers to see how well they came out of the process. If the quality is high enough, they might be rated to run at 800MHz. If not, the expectation might be scaled back to 600MHz. (Overclocking is when you run processors at a higher rate than the processor manufacturer deems safe.)

## Clock speed and performance

One of the first barriers to the success of the early Pentium was its clock speed. Although a Pentium 60 was faster than a 486DX4/100, Intel had a hard time selling it simply because the 486 carried the bigger number. The Emotion Engine in the PlayStation2 runs at less than 300MHz, yet it can churn through 3D geometry transformation many times faster than a 1GHz Intel processor can. The lesson is: a faster clock does not a faster processor make.

Performance depends on many factors: the number of execution units, unit efficiency, types of execution units and so on. Frequently, you will find that a processor is strong in some areas and weak in others. Integer and floating point equations are a good example. Although the PlayStation2 may excel at 3D graphics (primarily single precision floating point), the Pentium III would walk all over it in integer or double precision (64-bit) floating point tests.

Generally speaking, the following equation is used to determine the time it takes to execute a program:

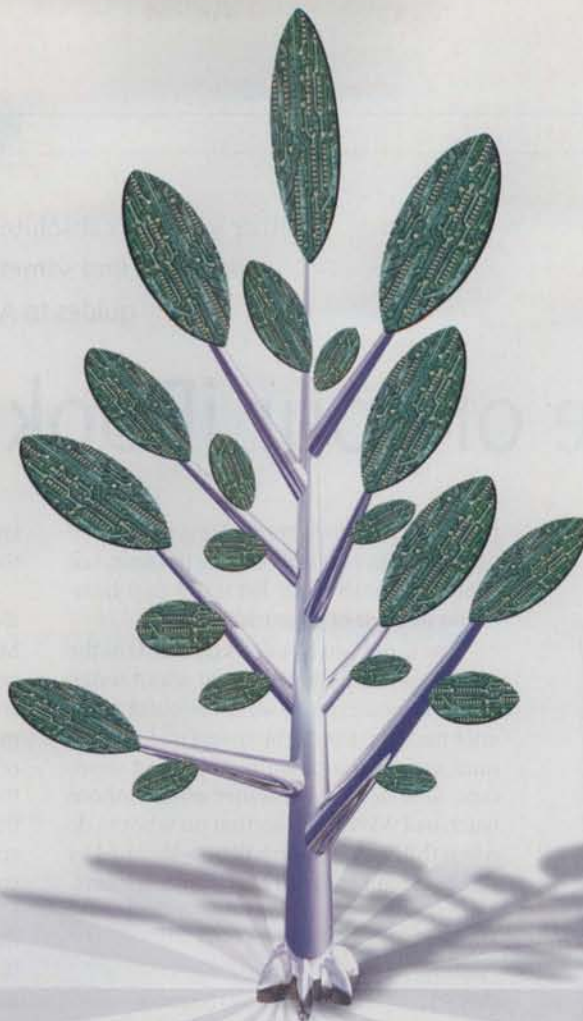
$$\text{time to execute program} = [ (\text{instructions in program}) \times (\text{cycles per instruction}) \times (\text{time per cycle}) ]$$

Going back to RISC and CISC, if you look at the different approaches, you can see that the CISC architecture is an attempt to reduce the number of instructions in the program, while RISC and VLIW designs try to reduce the cycles per instruction. Improving manufacturing reduces the time per cycle. Collectively, these factors will determine how fast your processor is for any given program. In a related topic next month, we'll look at benchmarks — what they are, how they work and their shortcomings.

Nathan Taylor can be contacted at [ntaylor@acptech.net](mailto:ntaylor@acptech.net). For a complete archive of APC Core columns, see <http://apcmag.com/core/>.



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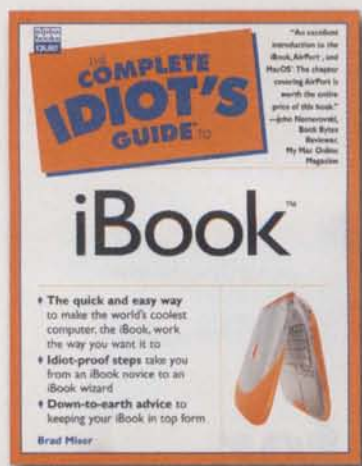
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Whether you're an absolute beginner or a seasoned computer user, you'll find something to suit you in our selection of guides to Apple's iBook. **By Stephen Withers**

# The Apple of your iBook

## The Complete Idiot's Guide to iBook



This title covers areas such as window manipulation, cut and paste, and managing documents in folders. As it's more basic than *The Little iBook Book*, it's a better choice for the complete beginner.

Readers are even shown how to do something useful with their new iBook (how to use AppleWorks to create a flyer, address list and mailing labels for a community bike ride) in the first quarter of the book. This is followed up with choosing and using a printer — there's not much point in doing all that work if you can't print the results.

Tips about power conservation, always an important issue for notebook users, appear as early as chapter two. There is also a useful section on setting up AirPort wireless networking, and material on ISPs that doesn't dwell too heavily on the US experience.

The photos aren't as good as those in *The Little iBook Book*; there are plenty of screenshots but, due to the overall page design and the absence of colour, the scheme used to highlight particular portions of the image isn't always clear.

The coverage of Internet Explorer and Outlook Express is good, but nothing is said about the Netscape alternative. The advice for beginners about using unformatted text in emails is especially welcome — not all

programs process formatted text properly, if at all. The list of Mac Web sites is sound, but short. The general site list is not that interesting to those of us outside the US.

'The Least You Need to Know' lists at the end of each chapter highlight about half a dozen key operations, and the quick reference material inside the covers includes the anatomy of the desktop, keyboard shortcuts, Sherlock and Internet abbreviations (such as FWIW). The section on what to do when things go wrong will be welcomed by those unfamiliar with Macintosh systems.

<b>Author</b>	Brad Miser
<b>Publisher</b>	Que
<b>Contact</b>	Pearson Education
<b>Phone</b>	(02) 9454 2319
<b>Price</b>	\$29.95
<b>ISBN</b>	0-7897-2284-4
<b>Rating</b>	★★★☆

## Easy iBook

The most attractive of the books reviewed here, *Easy iBook* is a, full-colour volume, and it's the same price as the books by Miser or Tollett and Williams. The use of colour isn't just cosmetic; it makes it easier to distinguish the various screen elements. This is further enhanced by a system of overlaid icons (clearly differentiated from what's on the screen) to indicate what you should do (eg. click the mouse or type some text) and where to do it. One cosmetic problem is that the computer used to produce the screenshots was set to display anti-aliased text. That in itself is no big deal, but the Helvetica font (used in sev-

eral of the examples) looks very unattractive when anti-aliased.

As with *The Complete Idiot's Guide to iBook*, the Internet applications covered are Microsoft's products and Netscape doesn't get a look-in. The balance between topics is a concern. For example, there's plenty of material about printing, but the coverage of AirPort is limited. You could argue that there are more people who use printers than use wireless networking, but the low-cost AirPort card is becoming increasingly common in homes and schools.

Like the other books reviewed here, *Easy iBook's* section on audio CDs doesn't mention that software is available to fetch track lists from the Cddb online database automatically (see <http://www.cddb.com/otherplayer.html> to follow this up). Similarly, there is no mention of Sherlock's ability to re-index an individual document or folder, which can save time. Furthermore, while AppleScript is featured, the description does not do justice to the power and flexibility of this Mac OS feature.

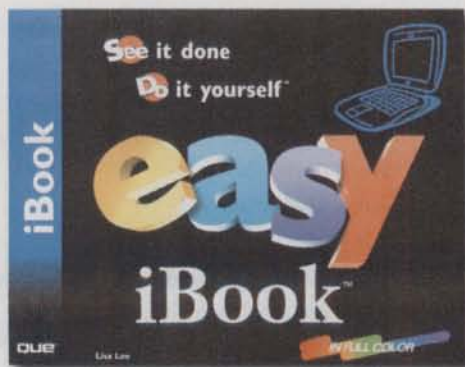
Despite its shortcomings, its clear explanations make this the pick of the bunch for the complete beginner.

<b>Author</b>	Lisa Lee
<b>Publisher</b>	Que
<b>Contact</b>	Pearson Education
<b>Phone</b>	(02) 9454 2319
<b>Price</b>	\$29.95
<b>ISBN</b>	0-7897-2272-0
<b>Rating</b>	★★★★

## How to Do Everything with Your iBook

This book weighs in at over 600 pages and 1.25kg, so Stauffer has apparently taken the 'everything' in the title seriously. It is arranged in four sections.

Part 1 is 'Getting Started'. It begins with the basics such as switching on and opening and closing windows, but it isn't for the faint-hearted. If your attitude is 'I can do this, just show me how', then you'll be fine. Readers with a more timid disposition will be more comfortable with *Easy iBook*.

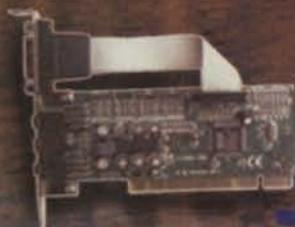




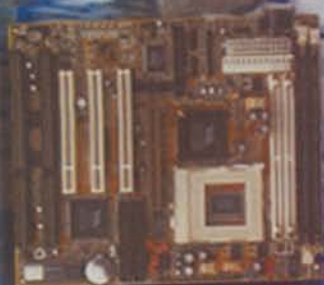


## Eagle TNT-2 AGP VGA Card W/32MB

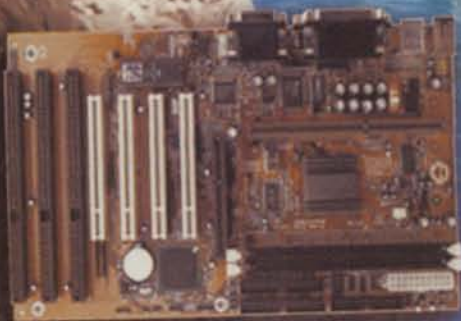
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'Getting Things Done' provides good advice on the use of AppleWorks for word processing, spreadsheets, databases and graphics; and explores using Palm Desktop for managing your schedule and contact list. Newcomers to AppleWorks will find the chapter on laying out a page especially valuable. When the time comes to play, there are even hints for success in the Nanosaur game that comes with the iBook.

'Getting Online' goes into the nitty-gritty of using Outlook Express, and it even tells you how to process incoming email automatically.

The final section is a potpourri, covering printing, networking, DOS/Windows coexistence, upgrading, troubleshooting and tinkering. There's plenty of material here to help get your iBook set up just the way you like it.

If you are ready to take the plunge into the world of Macintosh in general and iBook in particular, *How to Do Everything* may save you from having to buy an intermediate-level book after a month or two. This would make the extra \$10 money well spent.



**Author** Todd Stauffer  
**Publisher** Osborne  
**Contact** McGraw-Hill  
**Phone** (02) 9415 9899  
**Price** \$39.95  
**ISBN** 0-07-212419-9  
**Rating** ★★★★★

## The Little iBook Book

Tollett and Williams don't claim to have produced a book for the absolute beginner; rather it's for those with some Macintosh experience — as the back cover quaintly puts it, "beginnerish to advanced Mac users". Consequently, it avoids the usual explanations of windows and menus, and instead gets straight down to iBook specifics. This is done with the aid of a character called Url, who resembles Ratbert (of *Dilbert* fame).

It's already a little behind the times, because iBooks are now shipping with Mac OS 9 rather than 8.6. The other three books reviewed here cover the later version.

Also, the software bundle provided in Australia is slightly different to that accompanying US iBooks; instructions on how to open an Internet account with EarthLink is irrelevant. However, the more generic information on setting up an iBook for Internet access could be useful, even though this is not something most Mac buyers seem to have trouble doing.

A reasonable proportion of iBooks are used in conjunction with other Macintoshes, so the section on wired and wireless connections should be welcomed by that audience.

Mobility issues are well covered, although the advice "If the Location Manager confuses you, skip it! You can live forever without this!" is questionable. It's true, but Location Manager is worth the effort of mastering (yes, even though it can be confusing) if you connect your com-



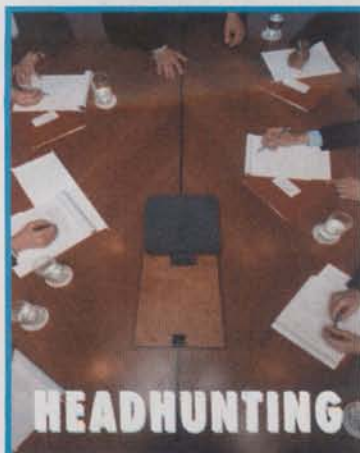
puter to different networks, use more than one ISP, or share it with someone else.

With over 200 pages, excluding the extensive index, this book lives up to its name and is quite lightweight as computer titles go. This is especially appropriate for a book about a notebook.

This is a good book if you are already reasonably confident but not especially competent with a Macintosh, and want to get the most from your new iBook.

**Authors** John Tollett and Robin Williams  
**Publisher** Peachpit Press  
**Contact** Pearson Education  
**Phone** (02) 9454 2319  
**Price** \$29.95  
**ISBN** 0-201-70093-X  
**Rating** ★★★☆

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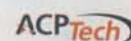
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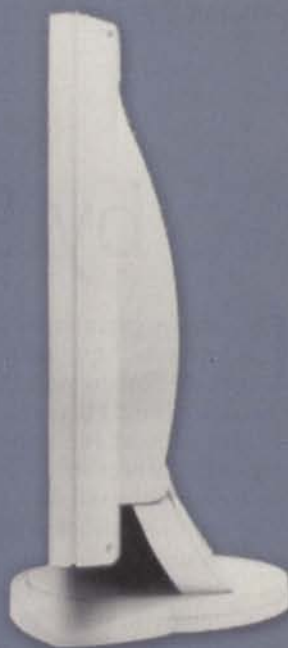
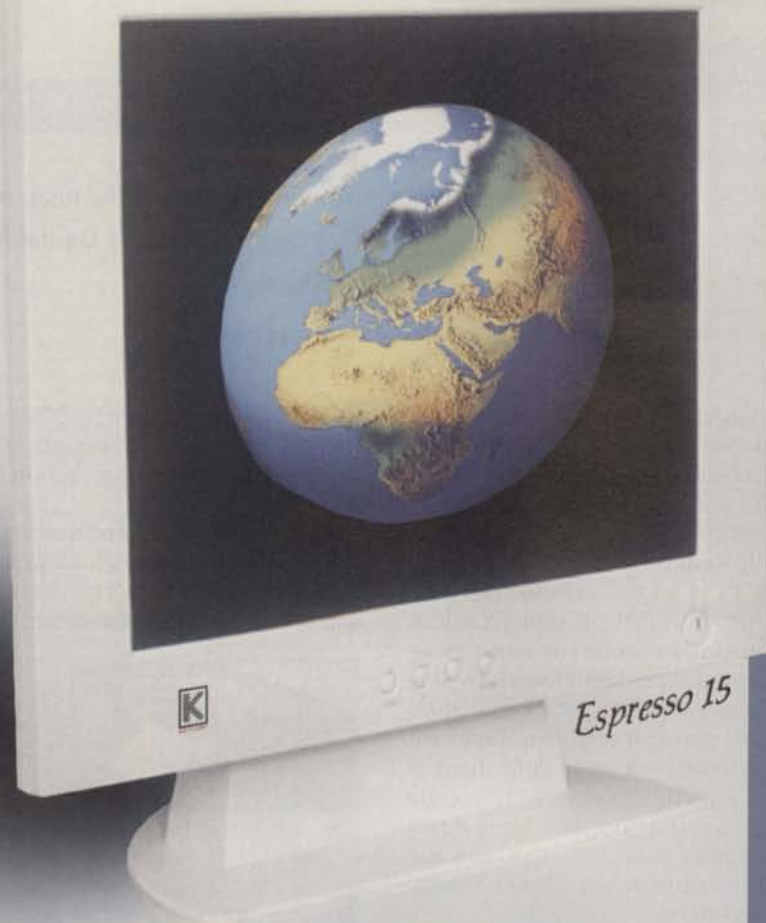
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If your system is crashing in the heat, maybe you need some grease. By Daniel Rutter

## Step by Step

Most modern computers contain at least two chips that generate enough heat to warrant their own heat sink. The CPU is the major source of heat in most PCs and, almost invariably, it has a heat sink with a fan attached (commonly referred to as a cooler). The main motherboard chip usually has a heat sink too. This chip can be identified as a low-profile, green-anodised aluminium square, held to the motherboard by miniature spring-loaded pins. Coolers are also built onto the main processor of many modern video cards.

Heat sinks and coolers help components keep their temperature down by moving heat from the hot component to the air. Chips become unreliable or stop working altogether when they get too hot. Most chips have a built-in mechanism that shuts them down before they become hot enough to damage themselves, but the shutdown will cause the system to crash.

For a heat sink to work properly, it needs to be able to efficiently conduct heat away from the component it's attached to. Clamping a bare metal heat sink onto the top of a chip will only work well if both the face of the heat sink and the top chip are perfectly flat. Since neither are likely to be flat enough, there will be as many air gaps *between the two surfaces* as there are points of contact. Air is an excellent insulator, so a connection like this won't work well. Nonetheless, many components are attached to their heat sinks using these so-called *dry connections*. For instance, the connections between common army-green motherboard chipsets and their heat sinks are usually dry and conduct heat very poorly.

It's easy to get a sense of how poor these connections are by examining them. If you yank the spring-pegs that hold the heat sink in place vertically with a pair of pliers, you won't encounter much resistance — usually, the springs don't even fall off the pins. You can re-insert the pins with a gentle push. It's quite hard to damage your motherboard by yanking the pins out, but if you do, we don't take any responsibility.

### Bridging the thermal gap

Where the demands of the situation are more critical — for instance, CPU cooling

— dry connections are unacceptable. Serious coolers come with some kind of thermal interface material which fills the air gaps with something more conductive.

The simplest interface material is thermally conductive tape, which may have adhesive on one or both sides. The tape is pre-installed on many coolers, including Intel's standard ones. However, thermal tape doesn't work terribly well; it's just too thick. It's better than having air gaps between chip and heat sink, but ideally you need your thermal interface material to selectively occupy those spaces that are left by a direct metal-to-metal connection. If you use tape, the two components won't directly touch anywhere.

This is where thermal transfer compound, also known as *heat sink grease*, comes in handy. It's a silicone-based preparation which contains thermally conductive particles — usually metal oxide dust. It can be applied in arbitrarily thin smears, creating a more effective thermal contact between the chip and the cooler.

A 5g tube of the most common heat sink grease can be bought from any electronics store for a few dollars. This is enough to grease dozens of chips. Use *just enough to fill all the tiny air gaps*. If you use too much grease, some of it will be syringed out of the edges of the junction as the mounting clips force the interface together, but it's physically impossible for the clips to exert enough pressure to squeeze away all the excess if you apply too much.

It's easy to get the amount right. Put a small blob of grease in the middle of the chip you need to cool, and then smear it around with your finger until the whole surface is covered. Below is a Celeron, prepared this way.



The surface of current FC-PGA Pentium III and Celeron II processors is much smaller, but they can be greased in exactly the same way.

Now place the cooler on the chip, in the same orientation as when it's clipped on, and press down firmly. Peel the cooler off again, and have a look at its surface.



The clean spots in the pattern of grease stamped onto the chip reveal potential air gaps. The amply covered areas have too much grease. Dab a little more grease on the parts of the chip that match clean spots, clean the heat sink surface with a tissue, and stamp it down again.

When you have the right amount of grease, you should feel friction when you try to move the cooler around. If it moves effortlessly, there's too much grease covering the surface of the chip; it should grate a little.



If none of your hardware displays any thermal problems, such as crashing on hot days, there's no reason to start greasing things. But if your system seems flaky, or you're overclocking it, then heat sink grease may improve your system's reliability.

Daniel Rutter can be contacted at [dan@dansdata.com](mailto:dan@dansdata.com). For a complete archive of APC Step by Step columns, see <http://apcmag.com/step/>.



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# Just do it yourself

A touching tale of two boys, a Pocketbook and a Linux print server. By Nathan Taylor

It's often said — usually by Linux enthusiasts — that Linux is a far better server operating system than Windows. Two APC staff members found out the truth of the matter when they were forced to install a Linux server in the APC offices by stealth.

## Support? Bollocks.

Our tale begins with an IT department in the worst tradition of IT departments: if the problem in question doesn't fall into its very limited sphere of support, then it doesn't care. Case in point: three staff members were using notebooks purchased from a vendor other than the company's preferred supplier. For some reason, these notebooks refused to print to the company's NetWare print servers. They'd spool, the documents would appear in the queue, then disappear. Nothing came out of the printer, and the documents were never heard of again. The IT department's response? 'Non-standard system? Don't care.'

After wasting a lot of time messing about with the notebooks, trying several system reinstallations and the installation of official Novell NetWare drivers (which worked occasionally), we — Pocketbooks editor Ashton Mills and myself — eventually ascribed the fault to that anti-technological entity that we jokingly refer to as 'The Force'. This is a mysterious power that prevents computers from operating in a logical, consistent manner. It retreats to the netherworld and allows everything to function smoothly when technicians arrive, but returns to wreak havoc immediately after they leave.

In a flash of inspiration, we decided to set up a print server ourselves, using a Pentium 90 that had been lying around since the last system upgrade. To prove our technical prowess, we decided to use Linux. After all, as Torvald's apostles will tell you, Windows is for wimps (actually, they're not usually that polite).

It seemed like a good idea at the time . . .

We grabbed a copy of the original *Linux Pocketbook* cover CD, rushed over to the machine, and had the system up and running with a fresh install of Red Hat 5.2 in no time (we named it 'Orac'). No problem.

Next, Samba. Samba is the tool that provides Windows file and print sharing on non-Windows machines. It uses the



same SMB protocol that Windows products use. From the network's point of view, a Linux system running Samba looks just like a Windows system. (Samba is included with all the major Linux distributions.)

To use Samba, all we needed to do was to start the Samba daemon, point it at some shared folders on the hard disk and everything would work. What's more, we were using the latest release of Samba at the time, version 2.0, which included a Web-based configuration tool called SWAT.

First, we used the vi text editor to edit the Samba configuration file (a file called *samba.conf* located in the */etc* directory), because we didn't want to set up Apache for SWAT to work. Later, we did use Apache and SWAT for the sake of simplicity.

Samba has the potential to trample all over Windows NT domain controllers, setting itself up as domain master and actually overriding NT systems. We thought about doing this out of spite, but decided against it; we hadn't heard any complaints from the IT department and we didn't want to attract any.

After we completed the simple task of setting up file sharing, we tried to connect our system to a Canon inkjet printer. It's often remarked on how far Linux has come in terms of hardware support. The truth is, printer support under Linux is still dire; the most recent Canon printer supported is several years old, and downloading the latest Ghostscript update didn't help. However, Samba doesn't require you to install a printer driver at the server to work; a client can install a driver and Samba can pass the information right on through. So, in one of life's little ironies, we could print to the printer connected to Orac via a client, but not directly from Orac. Later, we hooked Orac up to a more powerful PostScript laser printer that we could print to directly from Orac.

## On queues and printer ports

One of the first things we noticed about the print serving was its sluggishness. Of course, we assumed it was either the printer or the PC, and screamed bloody murder at both alternately. It turned out that the fault lay with neither; the culprit was a very obscure Linux configuration option for setting the speed of the parallel port. Red Hat 5.2 seemed to default to about 56Kbps, which is about 5% of the potential speed of the port.

We would never have figured this out if it weren't for an incredibly buggy Perl script installed on the system. In order to see the print queue from Orac (rather than the clients), we downloaded and installed a script that extracted information from the print spool and displayed it in a window. It worked fine — it even let us see which client owned which printout.



I'm far from a Perl expert, but it seems that a scripting language that allows a script to have a memory leak is a bit of a worry. However, it's perfect if you want your scripts to have special soak-up-all-memory-and-die features that keep your PC running at a crawl like ours did (or perhaps the script interpreter was faulty — but you get the point). We could muster enough processing power to kill the script and then restart it, but it was incredibly annoying.

At one stage during all this, we decided to install Caldera OpenLinux 2.2 on the system. It was much easier to install, but the KDE desktop in OpenLinux was slower than the Red Hat desktop. However, it did have two major advantages: a proper print queue display application and a utility for setting the port speed. It's only then that we realised why Red Hat had been printing so slowly; we set the port speed to its full 1Mbps, and printing was much faster.

Later, we installed Mandrake 6.0 on the system — another Linux distribution, which is based on Red Hat 6.0. No real reason, except that Mandrake is (supposedly) Pentium-optimised. Mandrake installed and ran smoothly for the most part. It was a little rough around the edges, but was generally well put together.

There was one problem with Samba, but we sorted it out quickly. Samba refused to talk to one of the client systems that had a beta version of Windows 2000 installed on it. However, a quick trip to the Samba Web site revealed that a patch for that very problem had been delivered days earlier. Open source can be a wonderful thing.

## The death knell: DHCP

Through bitter experience, we learnt that Linux — and Samba, in particular — just doesn't like living in a DHCP environment. For the first eight months of Orac's life, it was connected to a network that used static IP addresses. With a fixed IP address, we simply had to modify the system's IP address hosts file in the /etc directory to that which was linked to its WINS name.

WINS is the Windows networking service that links a name with a network address. The name 'Orac' was linked to the system's network address and published on the network, so that other systems searching for the computer named Orac could find it without having to know Orac's exact network address beforehand.

Samba can draw its hostname from a number of sources, but the simplest is to look it up in the Hosts file, located in the /etc directory of Linux. When we initially

configured the system, we hard coded the IP address and name into the Hosts file, so it looked something like:

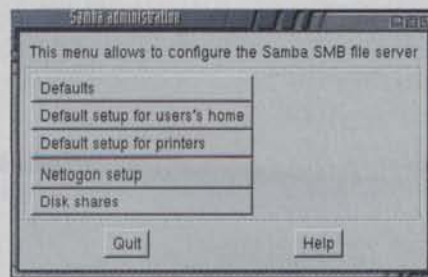
```
Orac    203.18.241.96.
```

Everything was working smoothly... until DHCP came along to ruin the day.

The dynamic host configuration protocol assigns IP addresses automatically from a predetermined pool. Each system is given an IP address as it connects to the network. All fine, in theory. However, if you run a server on a DHCP network, it's a real pain.

With a different IP address assigned to Orac, maintaining its WINS name became problematic. We didn't want to hard code Orac's IP and name into the Hosts file, because the IP address would change whenever Orac needed to restart. What's more, SWAT became difficult to access, because we needed to find the current address of the system each time we wanted to use it.

Windows systems are much better at WINS, because they look for WINS servers automatically (the DHCP designation can include the location of the server in it). However, Samba has trouble finding a WINS server with which to publish its name. Originally, Orac could cope, because it was on the same network segment as everybody who wanted to use it, and in this scenario Samba can perform a network broadcast to find a name. If you're on a multisegmented and broad-



Newer versions of LinuxConf have useful Samba management features

cast-restricted network (such as the one we moved Orac to), then you're in trouble.

After wading through endless reams of Samba documentation (this program has more switches and options than you could imagine), we learnt that you can point it to a WINS server manually. Through a 'friend' in the IT department, we uncovered the IP address of the WINS and server and pointed Orac to it manually. We were still left with the problem of finding a way to help Orac cope with DHCP environment's dynamic IP assignment; we still

## Uptime

From our experience with Orac, we can categorically say that the legends about Linux uptime are true. Technically, we never had to reboot the system. Under Linux, we could always kill an errant application, or restart a daemon that had gone off the rails. There were occasions when it would have been quicker just to reboot the system, but our Linux pride told us we had to keep the system's uptime ticker going over. And it did — it ran for 80 days without a single reboot.

When we eventually did reboot Orac, it was due more to human factors than to machine aberrations. There were the aforementioned distribution changes but, more to the point, my partner in crime is a CKU (compulsive kernel upgrader). If he hadn't constantly given in to his craven impulses, Orac's uptime might have reached far loftier heights.

failed to find a reasonable way of dynamically changing the host/IP configuration information Samba publishes.

In the end, we figured that Linux never goes down, so we could hard code the IP address and leave it running, confident that it would never need a new IP address. The DHCP server foiled us again; it would arbitrarily reassign Orac's IP address. Each time Orac's IP address changed, we'd have to go to Orac, edit its Hosts file and restart the Samba daemon. Annoying, but no big deal.

## Denouement

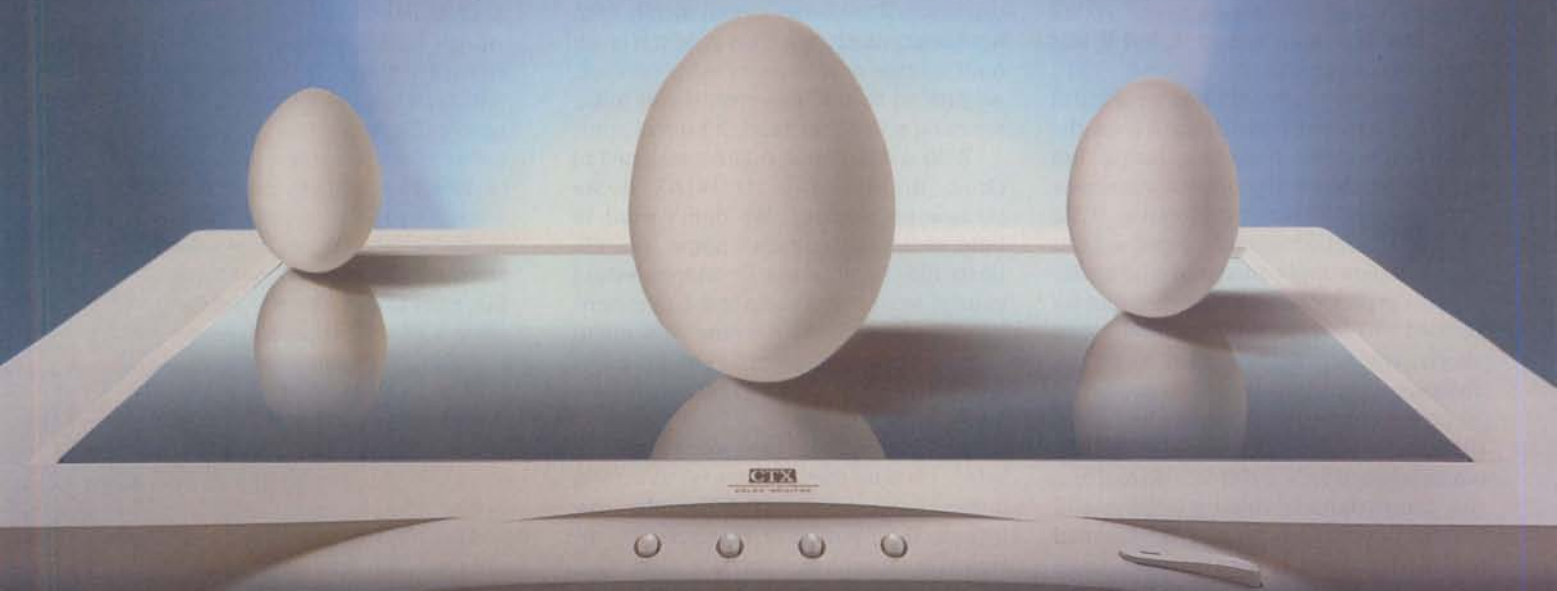
Just as we were contemplating some sort of script to automate the changes to the Hosts file, our tale of woe ended. One day, Orac simply refused to get a DHCP address. The Ethernet card was working. IP was working. The DHCP server simply refused to give it an address. Whether it was The Force or some insidious malefactors in the IS department, Orac refused to work.

In the end, we were forced to do what we feared most: install Windows 98 on Orac. Of course, we were a little crestfallen to find that it did the job and did it well — far better, and with fewer hassles than our Linux system ever did. It worked from the start, and it hardly ever crashes. Bugger.

Nathan Taylor can be contacted at [ntaylor@acptech.net](mailto:ntaylor@acptech.net). For a complete archive of APC Just DIY columns, see <http://apcmag.com/justdiy/>.



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Set up a Web server and an FTP server with Windows 2000. Then take a look at Microsoft's free videoconferencing application, NetMeeting. **By Kieran McNamee**

# Windows

## Set up a Web server

Windows' Inbuilt Information Server (IIS) can be used as a quick and easy method of sharing files. Although it isn't part of the standard installation, it can be easily installed from the Windows 2000 CD using the Add/Remove Programs dialog.

The controls for your newly setup component are now hidden away under Administrative Tools in the Control Panel. To access this directory, click Start → Settings → Control Panel → Administrative Tools. Several new icons have been added here, which can be used to administer your new Web site.

### Authoring Web sites

HTML pages — the files that browsers can read and understand — can be created with a number of tools, including FrontPage Express or even Notepad if you know the language. We won't present a treatise on producing Web pages here — that's a topic which could fill another Pocketbook — except to say that if you use the right tools (such as FrontPage or Macromedia's Dreamweaver), creating Web pages can be as easy as creating a document in a word processor.

You will have to create the pages you need for your Web site, of course. To keep things simple, the home page you create should be saved as 'default.htm'.

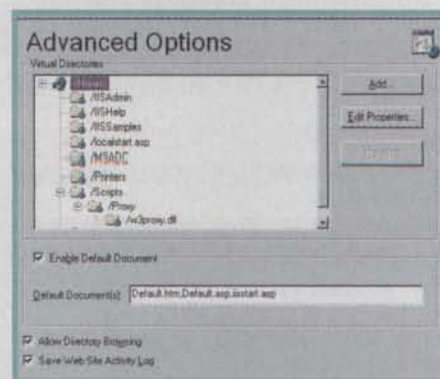
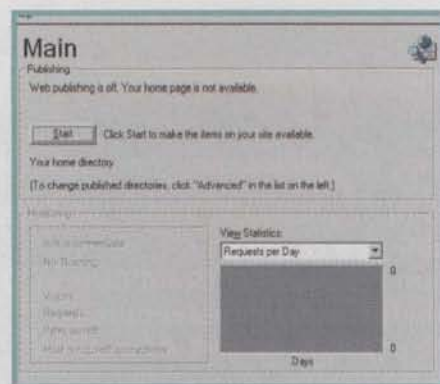
### The Personal Web Manager

The best way to configure your Web site is to use the Personal Web Manager. Double-click on the icon in Administrative Tools to access it. The application should open up on its Main page, which gives you quick details on the number of connections you currently have to your Web server, the number of visitors in total, and the amount of time your Web server has been up. As soon as you installed IIS, the Web server should have been started as a service in Windows 2000. If you don't want it running right now, click Stop.

The top of the Main page also contains details about your home directory. By default, your Web server's home directory is C:\INETPUB\WWWROOT. This means that any files in that directory, or any directory below it, are accessible via the Web. It is here that you put the HTML files

that you want to serve. Simply copy them across using Windows Explorer.

From a Web perspective, this directory appears as a root directory. Say, for instance, your IP address was 203.10.10.10. If somebody with a Web browser went to <http://203.10.10.10/MyStuff/start.htm>, they would actually be reading from the file start.htm from directory C:\INETPUB\WWWROOT\MYSTUFF on your hard disk.



You can change this home directory by clicking on Advanced in the left-hand panel. What you get is an Explorer-like view of a set of virtual directories. If you double-click on Home, a dialog box will appear. Change the value in the Directory field to set a new home directory, if you prefer, then click OK.

So what are these other directories? They are virtual subdirectories for your Web site which can be drawn from anywhere on your hard disk. If you double-click on /IISHelp, for instance, it will show you that the directory it points to on the hard disk is C:\WINNT\HELP\IISHELP. In the example above, however, it could be

accessed using a browser and going to <http://203.10.10.10/IISHelp>.

In the advanced Dialog, you can also set up a default page for directories. If the Enable Default Document tag is on, this is the page in a directory to which IIS will redirect the user if they try and enter a root directory without specifying a particular file. For instance, if a user just went to <http://203.10.10.10/>, they would automatically be redirected to <http://203.10.10.10/default.htm>, if default.htm was set up as the default page for directories. The exception to this is when Allow Directory Browsing is switched on (by checking the box in the Advanced view), in which case they would get an FTP-like file listing of the contents of the Web directories, from which they could choose a file to open.

To change the name of the page users are redirected to if they go to a directory instead of a file, simply change the names in the Default Document(s) field. It is possible to have more than one default page. You can have a list in the field, with each name separated by a comma. When a directory is requested, IIS will search through the directory requested for those files in order, and will deliver the file to the user when it's found. If it is unable to find a file of that name, it will give the user an error page, unless Directory Browsing is enabled.

### Accessing your site

From your own system, you can go to a browser and type <http://localhost/> to access your home directory. Other users will need to know your domain name (for example, [www.joe.com.au](http://www.joe.com.au)) if you have one, or your IP address.

The easiest way to find your own current IP address is to open up a Command Prompt (under Start → Programs → Accessories) and type IPCONFIG, which will tell you your IP address. Typing this into the browser's address bar will take you to your home page.

If you do have a dynamically assigned IP address — which most dialup accounts use — then every time you redial your ISP, you'll get a different IP address. This could make things difficult. If you're serious about setting up a permanent Web site, then you'll need a static IP and a permanent Web connection. Many corporate environments can offer this, and most ISPs



can also offer you a permanent connection with a static IP — at an additional charge.

To go the next step, you can actually register a domain name, which can be linked to a static IP, with Internet Names Australia or another domain registration authority.

## Set up an FTP server

In Windows 2000, just as in Windows 98, you can access shared directories over the Internet by going to Start → Run and then typing file://IP address, where IP address is the Internet address of the system you want to access. It's a nifty little feature if you know how to use it properly, but there a lot of systems which allow full access to their shared directories and are a security nightmare as a consequence. A more secure option is to share files via an FTP server.

Setting up an FTP server is very similar to setting up a Web server. First you have to set up IIS. There is, however, no easy Wizard for controlling the configuration of the FTP server — you have to do this via the Internet Services Manager in the Administrative Tools section of the Control Panel.

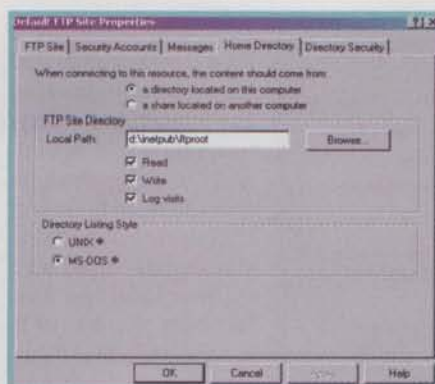
The default directory for an FTP site is C:\INETPUB\FTPROOT. Anything placed here, including subdirectories, will be visible from the root directory in the FTP client. The default for IIS allows anonymous access to this root directory and anything underneath it. If this is all you want, you may never have to go to the Internet Services Manager.

Expand the view by clicking on the + next to your computer name on the left. If you want to change your root directory, right-click on Default FTP Site and select Properties, then click on the Home Directory tab. Change the Local Path to whatever directory you want to appear as the root directory on the FTP client.

As with the Web server, you can also add virtual directories that will appear to the client as subdirectories. To add one, right-click on Default FTP Site in the pane on the left and select New → Virtual Directory. A wizard will appear. You need to give it an alias (what the FTP client will see) and a local path (the directory you want to share).

### Setting security

A very important aspect of setting up an FTP site is setting up security properly. To set security on a directory (and all its subdirectories), right-click on Default FTP Site and select Properties. If you want to allow only listed users (no anonymous access) to your Web site, click on the Security Accounts tab and deselect Allow Anonymous Connections. The FTP site will then



follow Windows' access rules about who can access what. You should create special user accounts for people logging into the FTP site; do this using the normal user administration methods. It's unwise to use an administrator or power-user password to log into an FTP site, as FTP logins are not secure Internet transactions.

You can also change read/write access rights to the home directory and virtual directories. In the Properties dialog of the home directory, click on the Directory tab and select or deselect Read and Write options.

The other thing you might want to change immediately is the number of users who can be connected at once. In the Properties dialog for 'default FTP site' (under the first tab), change the 'Limited To:' value to increase or decrease the number of simultaneous logins.

Users will have to find your FTP site the same way they would as if they were going to a Web site — except, they would type ftp://IP address in their Web browsers.

## Microsoft NetMeeting

It's becoming more common for co-workers to be located in different cities and time zones, so regular face-to-face meetings are often impractical and expensive. Products like Microsoft's NetMeeting are useful for this purpose, or to keep in touch with friends in distant places. NetMeeting is a complete data, audio and videoconferencing package that brings people together in a multimedia-rich virtual space.

Version 3.01 of NetMeeting was released at the end of last year. It's a big improvement on earlier versions and is likely to attract a lot of new users. NetMeeting is on this month's cover CD, or you can download it from Microsoft's Web site. Microsoft recommends that you uninstall any previous versions of NetMeeting before installing this one.

Setting up NetMeeting is a breeze. After entering your personal details, the Audio

## Wanna know more?



These Windows 2000 tips are taken from *The Windows 2000 Pocketbook*, your complete resource for getting the most out of Windows 2000 Professional. Pick it up from your local newsagency for \$14.95, or order online at [apcmag.com/shop](http://apcmag.com/shop).

Tuning wizard will walk you through the process of getting your speakers and microphone to work at optimal levels.

NetMeeting has an attractive interface. There is a dialpad in its centre that transforms into a video display region after you join video-meeting. Conference session participants are displayed at the bottom the screen, along with the four buttons that activate additional tools: Share Program, Chat, Whiteboard and Transfer Files.

You can initiate a meeting in a number of ways. If you know the IP address of the person you intend to communicate with, all you have to do is type it in. If they have NetMeeting loaded, they will be able to accept your call. In the past, you could search Microsoft's ILSes (Internet locator servers) to find other NetMeeting users. Microsoft has disabled the use of these servers, but you can find a list of current ILSes at <http://www.netmeet.net/best-servers.asp>. In order to use the latest version of NetMeeting (3.01), you must also have MSN Messenger installed. Through MSN Messenger you can initiate conference calls with fellow NetMeeting users on your contact list. NetMeeting can also be integrated with ICQ. Through ICQ, you can either find out the person's IP address via the Info option, or you can select the Internet Telephony/Games option to start up NetMeeting with the chosen contact.

If a number of participants are required to collaborate in the meeting, it's easier if one person plays host and provides a central point for the rest to join the meeting



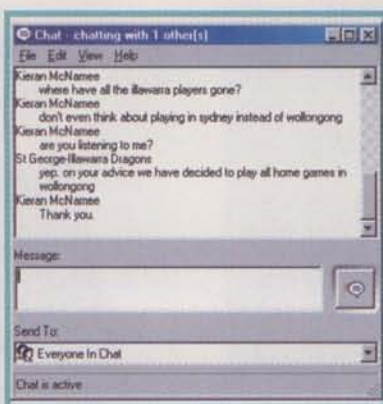
(this option is available under the File menu). The host can specify preferences that will help set up the meeting. Individual participants can then call the IP address of the person hosting the meeting or vice versa.

NetMeeting's video and audio capabilities are impressive. However, it can't overcome the Internet's bandwidth limits. Video and audio transmission is generally of poor quality; if you use the video feature you should be able to see your colleague's face, but don't expect to see his or her lips move in sync with the audio.

In addition to straight audio and video communication, NetMeeting provides a number of multimedia tools for interaction between participants. These tools are loaded as individual modules and they are easily accessible from the main interface.

If your audio connection fails, you can fall back on the chat utility. It doesn't have any fancy features — just text, like in an IRC (Internet Relay Chat) room.

NetMeeting's Whiteboard feature is a good business tool and can also be a lot of fun. When you activate the Whiteboard, a



paint application loads on every machine, and when someone draws on the whiteboard, everyone else can immediately see the changes they make. At the end of the session, everyone can save the whiteboard to their local machine for future reference or to continue to add to it during future meetings. Transferring whiteboard files is as simple as selecting the files and pressing Send.

NetMeeting's most useful feature is Share Program, which allows you to share specific programs that you have opened (or the entire desktop) so that other users can see what you are doing. It's a great tool for IT support staff. If you give your permission, another user can take over your mouse and control your computer from wherever they are in the world. You can regain control of your system at any time by pressing the Esc key. You should consider the security risks before using this feature.

NetMeeting allows you to encrypt all data transmitted between participants. You can also screen meeting participants using authentication certificates and password protection.

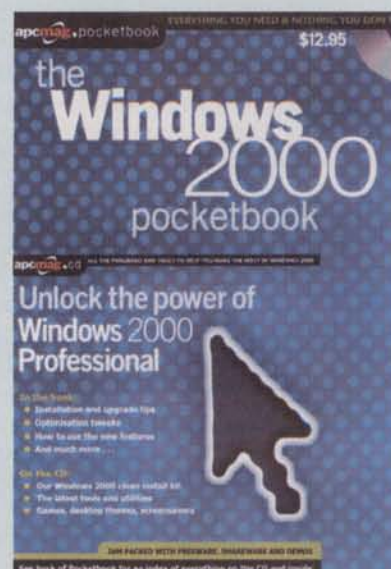
Business users who want to use NetMeeting can download an updated resource kit for administrators and developers and a Software Development Kit from Microsoft's NetMeeting Web site (<http://www.microsoft.com/windows/netmeeting/>).

Kieran McNamee can be contacted at [kmcnamee@acp.com.au](mailto:kmcnamee@acp.com.au). For a complete archive of APC Windows columns, see <http://apcmag.com/windows/>.

## APC Pocketbooks

Be one of the first to unlock the power of Windows 2000 Professional with *The Windows 2000 Pocketbook*, a clear and comprehensive guide to Microsoft's latest Windows operating system.

The Pocketbook contains all the programs and tools you need to make the most of Windows 2000 Professional, including installation and upgrade tips, and optimisation tweaks. The Pocketbook cover CD is jam-packed with the latest tools and utilities, games, desktop themes and more.



If there is a specific topic you'd like to see covered in Pocketbook format, send your suggestions to [pocketbooks@acptech.net](mailto:pocketbooks@acptech.net).

## Windows shareware

### CoffeeCup Gif Animator 4.0

Create animated GIFs by simply dragging and dropping your desired images onto the workspace.

### WindowBlinds 1.2

Use WindowBlinds to completely customise your desktop. You can change the style of title bars, toolbars and buttons.

### SiSoft Sandra 2000.3.6.3

This set of diagnostic and benchmarking tools will keep your computer at peak performance.

### Windows Commander 4.03

Replace Windows Explorer with Windows Commander and make use of all its enhanced file management features.

### InoculateIT Personal Edition 5.0.1

Everyone needs an antivirus tool to protect their system. This one is completely free.

All these packages can be found on this month's cover CD, along with more detailed reviews.



# Linux

Every time a HTTP request is made of Apache, it logs a one-line entry (usually a very long line) in the `access_log` file, which is commonly found in the `/var/log/httpd` directory. Here is one example of an `access_log` entry:

```
dialin01.example.com.au
-- [29/Mar/1999:16:27:09 +0930]
"GET /newsletter/1998-11/ HTTP/1.0" 200
5926
"http://www.webcrawler.com/cgi-bin/
WebQuery?searchText=%22substantial+
assistance%22" "Mozilla/4.05 [en] (Win95; I)"
```

Each line is made up of fields, and each field has a particular meaning. The above example is in the 'combined' log format. There are other formats, but this one is used a lot. The contents and meanings of each field are listed below.

## dialin01.example.com.au

This is the host that the HTTP request was received from.

--

These are placeholders for the ident and auth fields which can identify the user requesting the item from the Web server. Ident is rarely used, because it is unreliable. Auth is set to the username that requested the page, if your server has been configured to perform authentication (for example, with the `AuthType Basic` directive).

[29/Mar/1999:16:27:09 +0930]

This is the date and time of the request; +0930 represents the time zone (in this case 9.5 hours ahead of GMT/UTC).

GET /newsletter/1998-11/ HTTP/1.0

This is the actual request received by the Web server and the version of the HTTP protocol used. The full domain prefix has been omitted.

200

This is the response code that the server provided; 200 is the OK response, which means that the request was understood and accepted. Another common response code is 404, which indicates that the requested file does not exist.

This is the number of bytes that were transferred to the client to fulfil the request (excluding the HTTP headers).

http://www.webcrawler.com ...

This is the *referer* field (not 'referrer', as it was misspelt in the original specification), and it indicates the URL of the referring document. In this example, the user clicked on a link to our /newsletter/1998-11/ document from the results of a search on WebCrawler for the phrase 'substantial assistance'.

Mozilla/4.05 [en] (Win95; I)

This is the *user agent* field which indicates what browser or program requested the page. The most common user agents are Mozilla (Netscape) and Mozilla compatible (Microsoft Internet Explorer). Spiders used by the search engines also identify themselves here; for example, AltaVista's spider reports itself as Scooter.

The common log format which is sometimes discussed is an older version of the combined log format. The two formats are the same, except that the common log format lacks the last two fields (referer and user agent). These two fields can be very useful and Apache often comes configured for the common log format, so you'll probably want to know how to specify the log format you use.

In Apache's `httpd.conf` configuration file (usually located in `/etc/httpd/conf`), there are a couple of predefined log formats (combined and common) which are defined with a `LogFormat` directive. One of these log format names can then be used with the `CustomLog` directive to select which format the log should actually be generated with. The default `CustomLog` line is `CustomLog logs/access_log common`.

If you want your logs in the combined format instead, just change 'common' to 'combined', and tell Apache to reread its configuration file by sending a USR1 signal to the master `httpd` process with the `kill` command (see 'Rotating log files' for more information on restarting Apache).

## DNS lookups

In our example, the `access_log` line displayed the client's hostname as `dialin01.example.com.au`, but Apache's default

configuration would actually have logged the IP address. The conversion of Apache IP addresses to real hostnames is controlled by the `HostnameLookups` directive. You should leave this set to off — if you turn it on, your clients will experience a slight lag as the server will need to do a DNS lookup (which usually takes a number of seconds to perform) before it can respond.

However, hostnames are far more meaningful to humans than IP addresses, so you'll want to log hostnames somehow. The best solution is to use a separate program to process your log files and perform the necessary DNS lookups at a time when there isn't a client waiting for the server to respond.

You may be planning to use Web log analysis programs to gain more meaningful information from your logs. Many of them can do DNS lookups themselves, but it makes sense to do it as a separate step beforehand if you regularly run more than one program over the same logs (or if you want to rerun the same program with different options).

Apache includes a C program called `logresolve`, which will read a log file from standard input and write a version with all IP addresses resolved to hostnames to standard output. It is not a fast program, because it only does one lookup at a time, but this won't matter if it is run from a cron job when nobody is around to notice how long it takes.

A Perl script called `logresolve.pl` is also included with Apache. This script performs the same function as the C version, but it is faster because it performs multiple lookups simultaneously.

## Rotating log files

Left unchecked, the log files generated by your Web server will balloon to gigantic proportions, so it is necessary to archive or rotate them periodically. Some distributions will set this up for you automatically (for example, Red Hat's `/etc/logrotate.d/apache` configuration will rotate the logs weekly and keep the last four weeks' worth), but you may want to customise your log handling.

'rotate-access\_log script' (see page 140) shows an example script that can be run from root's `crontab` to regularly rotate



the logs at midnight, rename them to access\_log-yyyy-mm-dd (where yyyy-mm-dd is yesterday's date, because at midnight, all the entries in the current log will be for the previous day), run logresolve to resolve the IP addresses, and finally compress the log into a gzip archive.

## rotate-access\_log script

```
#!/bin/sh

cd /var/log/httpd

# Get yesterday's date in yyyy-mm format
DATE='date -d '1 day ago' '+%Y-%m-%d'

# Rotate the log
mv access_log access_log-$DATE
kill -USR1 `cat /var/run/httpd.pid`

# Wait a couple of minutes
sleep 120

# Resolve hostnames and compress
logresolve < access_log-$DATE | gzip >
access_log-$DATE.gz

# Remove the unresolved version
rm -f access_log-$DATE

To run rotate-access_log daily at
midnight, the crontab line would be:
0 0 * * * /usr/local/sbin/rotate-access_log
```

The following shell script contains a few things you may not have seen before, so we'll go through it starting from the

second statement (the text in bold is what you would type at a shell prompt).

```
date
Mon Jan 15 13:50:17 CST 2000
$ date '+%Y-%m-%d'
2000-01-15
$ date -d '1 day ago' '+%Y-%m-%d'
2000-01-14
$ DATE='date -d '1 day ago' '+%Y-%m-%d'
$ echo $DATE
2000-01-14
```

Have a look at the line that sets the DATE variable. The part of the line after the equals sign is enclosed by back ticks (the symbol on the key found below the Esc key, on the same key as the tilde ~). In this case, the back ticks ask the shell to run the command between them, and use its output to substitute the original command line within the back ticks.

The next step in the shell script is to rename the access log file. The DATE variable which was set in the previous line is referenced with \$DATE, so if it was set to 2000-01-14, the actual command to run it would be mv access\_log access\_log-2000-01-14. Run once a day at midnight, this would give you one file a day, named according to the day the logs are for.

The following line that begins kill -USR1 . . . sends USR1 (the first user-defined signal) to the master Apache process. For Apache, the USR1 signal is interpreted as a request for it to reload its configuration file and reopen any log files. If you don't send the USR1 signal to Apache after renaming the access\_log, it will continue writing to the renamed file. This is definitely not a desirable result.

So that you know which process ID (PID) the master Apache process has, Apache maintains a file called httpd.pid for you. This file is often stored in the /var/run directory, but it can be configured through your Apache configuration with the PidFile directive.

Since the process ID is stored in a file, and you need to pass it on the command line to the kill command, our script again needs to use back ticks.

After waiting a few minutes (the 'sleep' command simply does nothing for the given number of seconds), you can assume that Apache is no longer writing to the dated access\_log file you want to process, so run the logresolve program with the access\_log as its input, and send its output to the gzip program, which is then written to the same filename with a .gz extension.

Gzipping the file is not strictly necessary, but it can help save on disk space if you are short of it. If you don't want to gzip the file, whatever you do, don't do this:

```
logresolve < access_log-$DATE > access_log-$DATE
```

If you use the line above, you will wipe out your access\_log file because your shell will replace your input file with a new empty output file before starting the logresolve program. To prevent this, just append an alternative extension (eg. '.resolved') to the end of the destination filename.

Once logresolve has finished, the old unresolved and uncompressed version isn't needed any longer and can be removed.

There is a more robust version of the shell script in listing 1 of the Linux code on this month's cover CD. It checks for a number of

## Linux freeware

### Ethereal

This packet analyser captures data 'off the wire' from a live network connection and views that data in a simple hierarchical tree, providing a means to identify issues in large-scale networks.

### ChiliSoft ASP

ChiliSoft ASP provides Active Server Pages on top of Linux's Apache for building dynamic Web applications.

### Citrix ICA Client

Linux users can have applications served to them from a Citrix MetaFrame server using Citrix ICA Client.

### Nessus

Security administrators can use Nessus to comprehensively audit their networks for security vulnerabilities.



### Virtual Network Computing

This remote display system enables users to control a remote computer as easily as if it were their own.

All these packages can be found on this month's cover CD, along with more detailed reviews.



error conditions (for example, you don't want your logs accidentally deleted because the logresolve program couldn't be run or you ran out of disk space).

## Access log analysers

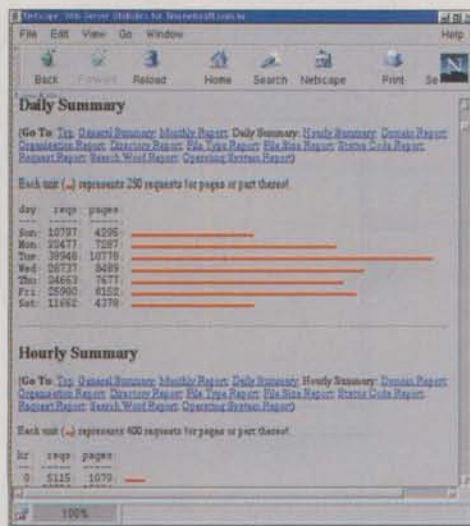


Figure 1: Sample Analog report

Now that you have the access logs arranged neatly by day, what can you do with them? Reading your logs as is might be interesting for the first few lines, but you probably won't get as much out of them as you might if you ran a program such as Analog or The Webalizer over them. Once you've set the options, you can extend your shell script to automatically run the analysis program.

Analog is available from <http://www.analog.cx/>. There are about 30 different reports that it can generate, including information about who is accessing your Web site and when, which directories and files they are accessing, who links to your pages, which search engine query strings are leading people to your site and which browsers people are using. Analog also has many custom options. Its reports are generated in HTML format, so they are viewable on the Web with any browser. Figure 1 shows the daily summary produced by Analog.

The Webalizer is available from <http://www.mrunix.net/webalizer/>. It

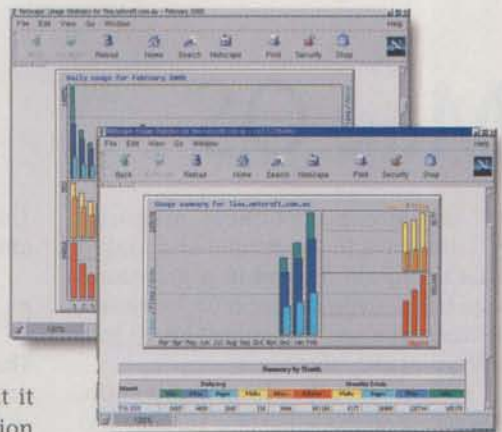


Figure 2: Sample Webalizer report

doesn't produce as many reports as Analog, but the information is presented in a more graphical format where possible (for example, usage by country is shown as a pie chart). Figure 2 shows two summary graphs generated by The Webalizer.

Geoffrey Bennett can be contacted at [geoffrey@netcraft.com.au](mailto:geoffrey@netcraft.com.au). For a complete archive of APC Linux columns, see <http://apcmag.com/linux/>.

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# Mac OS

Last month's example programs started at the beginning and worked through to the end in a procedural way, but sometimes that must be varied. In Basic, you use the statements `if`, `goto` and `gosub` to do this.

To change a program's direction, depending on the value of a variable you would use the `if` statement. The following example prints different messages depending on whether a positive or negative value is entered. Zero is considered positive here.

```
10 input "Type a number: "; n
20 if n < 0
30 print "That's negative"
40 else
50 print "That's positive"
60 endif
```

(Note that the `else` clause is optional.)

Generally the `goto` statement is avoided by basic programmers, and it is only included here for educational reasons. The following program will never display 'Still here' as the `goto` statement directs the computer to jump to straight to line 40.

```
10 print "Hello"
20 goto 40
30 print "Still here"
40 print "Goodbye"
```

Simply put, the `gosub` statement means 'go to this subroutine'. When a program reaches a `gosub` statement, it jumps to the line the `gosub` statement specifies and executes the statements there until it encounters a `return` statement. It then resumes the program at the line immediately after the `gosub` statement. Using `gosub` in conjunction with subroutines to perform the same calculation on different values saves duplicating and editing code repeatedly at different points in a program. Here is a short example of how to use `gosub`.

```
10 input "Price? "; p
20 gosub 50
30 print p; "inc. GST"
40 end
50 p = p * 1.1
60 return
```

Note the end statement in line 40. The program stops running when it reaches an end.

This prevents it falling into the subroutine after it executes the print statement.

## Chipmunk Basic

There are two main ways of entering a program into Chipmunk Basic. The first, coding it in line-by-line, is OK for small programs, but you may want to automate a few steps as your programs get larger. The alternative is to use BBEdit or BBEdit Lite (its freeware version) in conjunction with the `bb2cbas` plug-in that accompanies Chipmunk Basic. If you do, you won't have to enter line numbers as they will be added automatically when you transfer your program to Chipmunk Basic (see the file called `chipmunk-basic quick-ref` for more details).

When you need to use statements that refer to line numbers, such as `gosub` and `goto`, in other parts of the program you use labels instead. The following program revises the previous example using `goto`, replacing the reference to a line number with a label.

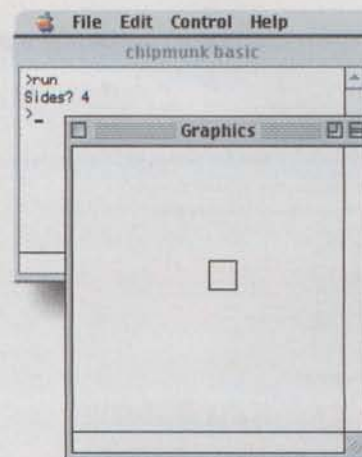
```
print "Hello"
goto gb:
print "Still here"
gb:
print "Goodbye"
```

Chipmunk Basic's graphics support may look familiar to those who have seen Logo or Microworlds. You create shapes by commanding a sprite. You create graphics by supplying simple geometric information to the sprite that lets it navigate across the screen drawing your desired shape. The following program draws regular polygons.

```
10 input "Sides? "; sides
15 angle = 360/sides
20 graphics 0
30 cls
40 sprite 1,100,100,1
50 for i = 1 to sides
60 sprite 1 forward 20
70 sprite 1 turnright angle
80 next i
```

Line 15 calculates the angle the sprite must turn at each corner; 20 and 30 activate and clear the graphics screen. Line 40 selects sprite 1 and positions it at coordi-

The second part in the Mac OS series on Basic explains how to alter the flow of a program and manage files using Chipmunk Basic. By Stephen Withers



nates 100,100. The final parameter specifies the appearance of the sprite; experiment with sprites 128 to 141 or check the documentation to create your own. Sprite 1 is invisible, and therefore is ideal for many situations.

## Files

It's useful to have some programming knowledge when you need to reformat data in a file in order to transfer it to or from another system or application.

As an example, the following program replaces all occurrences of an em dash (`chr$(209)`, Option-Shift-minus) with two minus signs. It processed a 400-line test file in less than 1.5 seconds.

```
10 open "SFGetFile" for input as #1
20 open "SFPutFile" for output as #2
30 linecount = 0
40 starttime = timer
45 while not eof(#1)
50 out$ = ""
60 input #1, in$
70 for i = 1 to len(in$)
80 if mid$(in$, i, 1) = chr$(209) then
90 out$ = out$ + "-"
100 else
110 out$ = out$ + mid$(in$, i, 1)
120 endif
130 next i
140 print #2, out$
150 linecount = linecount + 1
160 wend
180 stoptime = timer
```



```

190 close #1
200 close #2
210 print linecount;" lines processed in
    ";stoptime-starttime;" sec"
220 end

```

The program opens "SFGetFile" for input and opens "SFPutFile" for output. Once a file is opened, data is read from it with input # and written to it with print #. The number following the # in the input statement identifies the file to the program. It is specified in the as clause when the file is opened. Note the use of mid\$ to find the character you want to replace.

The first parameter is the string you are searching, the second is the starting character (in this program, this is the loop index as you want to work through the entire string), and the third is the number of characters to be extracted. If the character is the one you're looking for, the replacement character is added to the output string (line 90), otherwise the existing character is added (line 110). The while loop (lines 45 to 160) ensures that each line in the file is processed. Once the end of the file is reached, eof(#1) returns true, the loop terminates and the program continues at line 180.

You can filter files using AppleScript, but it's much slower. This script (emdash-script, included on this month's cover CD) will process the same amount of data more quickly. Each of our previous programs could have achieved their objectives using the replace function in any word processor or text editor, but writing a program allows you to perform multiple operations on a file and customise it for specific tasks.

The following example illustrates the use of a custom menu and text to speech. As a novelty, it also demonstrates Chipmunk Basic's ability to convert text strings into Morse code. The program also draws colour pixels randomly in the background of the graphics window.

```

10 cls
20 finished = 0
30 x = rnd(-1)
40 sub m()
50 morse "Mac OS Workshop",16,40,13,700
60 end sub
70 sub s()
80 say "Mac OS Workshop:",210,50,3
90 end sub
100 sub q()
110 finished = 1
120 end sub
130 call "wintitle", "Dotty"
140 graphics window 25,25,200,200
150 menu 4, "Commands", "Morse
    code;Speech;Quit", "m();s();q()"
160 while not finished
170   doevents()
180   graphics color
        rnd(1)*100,rnd(1)*100,rnd(1)*100
190   graphics pset rnd(1)*200,rnd(1)*200
200 wend
210 graphics -1
220 call "wintitle", "Graphics"
230 menu 4, ""
240 end

```

Lines 10 to 30 take care of initialisation, and 40 to 120 contain the subroutines that implement the menu commands (referenced by name in line 150). The first parameter to either say or morse is the string to be spoken or played as Morse code. Line 130 names the graphics window 'Dotty', while 140 opens that window at coordinates 25,25 and makes it 200 pixels square. Line 150 inserts our custom menu into the menu bar. The word Commands appears in the menu bar, and the menu items include Morse code (which triggers subroutine m()), Speech (subroutine s()) and Quit (subroutine q()), which causes the program to drop out of its main loop by changing the value of the variable finished).

Lines 160 to 200 form the event loop. Line 170 causes menu and other actions to be processed, 180 generates a random

colour specified as percentages of red, green and blue, and 190 draws a random pixel in that colour. Lines 210 to 240 clean up, hiding the graphics window and returning its name to the default, and removing the custom menu. You will need to allocate extra memory to Chipmunk Basic to run this program.

## Scripting

You can interact with a Chipmunk Basic program using AppleScript, which makes it possible to link your Basic programs with other applications. Run the program above, then run the following AppleScript from the Script Editor.

```

tell application "chipmunk-basic-3.5.6"
    DoScript "eval m()"
end tell

```

You should hear a Morse code version of the words 'Mac OS Workshop'. Conversely, if you run the following script then go back to Chipmunk Basic and print the value of finished, the result is 99 rather than 1 or 0 as assigned in the program.

```

tell application "chipmunk-basic-3.5.6"
    DoScript "finished=99"
end tell

```

Chipmunk Basic has many useful features. It even supports structures and classes as found in more fashionable languages (see the text file Structures and Classes, and the programs person.bas and relation.bas on this month's cover CD). For Basic programming on the Mac, try Metal and the RealBasic demo which are also on the CD.

Stephen Withers can be contacted at [swithers@ozemail.com.au](mailto:swithers@ozemail.com.au). For a complete archive of APC Mac OS columns, see <http://apcmag.com/mac/>.

## Mac OS shareware

### Anarchie 3.7

This classic Macintosh FTP client can mirror Web site folders, download entire Web sites and resume interrupted file transfers.

### Fortify 2.2.6

Fortify adds 128-bit encryption to export versions of Netscape Navigator or Communicator 4.0.6 to 4.7.2.

### ICQ 2.0 Beta

This is the standard ICQ application. Use it to participate in conferencing or one-to-one text messaging.

### iVisit 2.3b7

Desktop digital camera owners can use iVisit to videoconference.

### OptimaHTML 2.0

OptimaHTML reduces the size of Web pages created in WYSIWYG editors by stripping unnecessary HTML.

All these packages can be found on this month's cover CD, along with more detailed reviews.



# PDA's

One excellent feature of Windows CE-based handheld devices is that they can connect directly to networks. In addition to vast improvements in synchronisation speed over the standard serial or infra-red connection, a networked CE device can access network resources like shared folders. If your network has Internet access, you can browse the Web and use your email online in real time, instead of accessing it using ActiveSync to gather batches of information and viewing them offline.

In a corporate environment, you can use your CE device to access standard Unix applications via Telnet, or run Windows-based programs using a Citrix or terminal server client program. If your desktop computer is connected to the local area network (LAN), you can synchronise your Microsoft Exchange contact and calendar information from a remote network location. This can be particularly beneficial if your company uses a wide area network (WAN) or LAN to connect geographically remote offices that you visit frequently, or if your office supports wireless networking.

## Hardware options

To connect your CE device to a network, you'll need a Windows CE-compatible Type II PCMCIA or CompactFlash Type I card, an RJ-45 cable and a hub with a spare port. Few network cards provide driver support for Windows CE. Socket Communications (<http://www.socketcom.com/>) specialises in network cards for handheld devices and sells most units for about \$350. If your office network supports wireless networking technology, you may be able to use a CE-compatible wireless network card, but you should check with your IT department before you purchase anything. Lucent (<http://www.lucent.com/>) sells a card capable of 11Mbps for about \$150 and Proxim (<http://www.proxim.com/>) sells a 1.6Mbps card for approximately \$650.

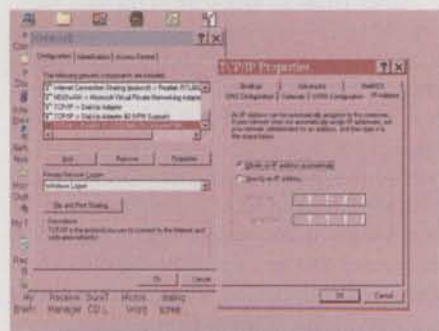
## Pocket computer or workstation?

If you haven't already done so, you'll need to establish an ActiveSync partnership between your desktop computer and handheld through a standard serial or

infra-red connection before you can create a network connection. You use an ActiveSync connection to install the Windows CE network card drivers onto your handheld. Your network card should include instructions for doing this.

Before you physically connect your handheld to the network, you will need to make sure it has, or will be assigned, an IP address. IP addresses allow devices to locate each other on a network.

Corporate networks typically use something called DHCP (Dynamic Host Control Protocol) to designate IP addresses to each device on the network dynamically as it connects to the network. Check with your IT department to see if your network uses DHCP. Windows CE handheld devices use DHCP by default, so if your network uses it, there is very little



you'll need to do to connect to it. Simply plug your handheld directly into a standard RJ-45 socket (whether it be in a wall or a spare port on your hub), then go to the control panel on your handheld, select Network, Identification and then enter in your network username, password and the name of the Microsoft domain or workgroup.

If your network doesn't use DHCP, go to the handheld's control panel and press the Network button. Tap on the Adaptor tab, select the appropriate network adaptor and press the Properties button. If your network administrator has assigned an IP address to you, enter it here. If you have a choice, use a number like 192.168.1.100 and place 255.255.255.0 in the subnet mask field.

You can access network resources by running Windows Explorer on your handheld. Unlike Windows 95, 98, NT and 2000, the CE version of Windows Explorer doesn't have the ability to browse network resources, so you will need to know the



network path information for the server or workstation that you intend to access. Type that information into Windows Explorer's address field manually (eg. \\server1\). You can add frequently used resources to your Favorites menu for easier access in the future.

Once you have established your network connection, you can also use your handheld's version of Internet Explorer to browse the Web. If your office network uses a proxy server, make sure you enter that information into the appropriate fields in Internet Explorer's setup options, otherwise you may have difficulty accessing the Web.

You can use Pocket Outlook to access IMAP4 mail folders and run Telnet clients to access terminal services. Just remember, if you create a document on your handheld in Pocket Word or Excel, you need to use Save As to convert it into an Office 97 format that your PC can read. The handheld will automatically convert your Office documents to native handheld format.

If you intend to synchronise your handheld with your desktop PC from a remote network location, you'll need to leave ActiveSync running on your base computer. When you're ready to start synchronising from a remote location, simply run ActiveSync on your handheld. From the top pull-down menu, change the settings from their current state (Serial Port or Infrared Port) to Network Connection. When you press the Connect button, your system should synchronise with your remote desktop, as long as you haven't changed the name of your desktop system's network since you first installed ActiveSync.

Ronald Rosenbaum can be contacted at [ron@ats.au.com](mailto:ron@ats.au.com). For a complete archive of APC PDA's columns, see <http://apcmag.com/pdas/>.



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Contain yourself: managing and storing data in C++. By Michael Smith

# Simple C++

In his book *The New Hacker's Dictionary*, Eric Raymond quotes Parkinson's Law, which says that data expands to fill the space available for storage. As long as it holds true, there is a need to create efficient and flexible ways to store and manipulate that data; we need containers.

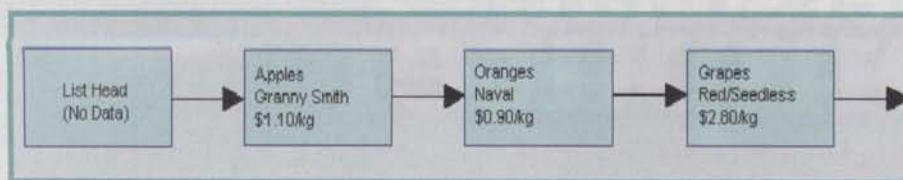
The simplest container is the *array* (see APC June 1999, page 163). An array is a collection of objects stored consecutively in memory. You can access any of the objects by its index, but moving objects around in the array can be cumbersome. Listing 1 is a simple array-based program that reads in some strings, then writes them out again.

The C++ Standard Template Library (STL) provides a variety of container class templates, but before looking at specific templates, you need to understand data structures a little more. Most containers are based either on arrays or on linked lists.

The linked list is a standard computer science problem. The concept is not difficult to grasp, but the execution can be tricky. The linked list concept is based on the *node*. A node is a data structure that contains some form of data, plus a pointer to the next node.

Listing 2 shows a simple implementation of a stack using a linked list. It begins by creating a data type to represent the node. In this case, there are only two parts to the *node\_t* structure: a string for data and a pointer to the next node. Whereas the *CStack* class from April's Simple C++ (see APC April, page 149) contained an array of data items, this list-based *CStack* class contains a pointer to the head of an (initially empty) list. The *Push()* method allocates a node and pushes it onto the head of the list, while the *Pop()* method removes a node and deletes it. One of the nicer features of object-orientated design is apparent here. The program that uses the *CStack* class does not know whether it uses a list or an array, and you can switch between them without any impact on the rest of the program.

Whether you use a list or an array will depend on the kind of operations the program will be performing. If you're handling small data sets and small transaction numbers, it makes little difference. However, if you're using very large data sets and/or large transaction volumes, then efficiency becomes more important.



A simple data array

You might have a special node, called the list head, at the beginning of the list. The last node might point back to the beginning, or the pointer might be set to some known value (such as zero) to define the end of the list. To locate a particular node, you start at the head of the list and search along the list until you either find what you're looking for, or you recognise the end of the list. A variation on this, the double linked list, has a pointer to the previous element as well as the next, which means that you can search backwards as well as forwards.

Searching, sorting, inserting and deleting nodes can require a considerable amount of pointer manipulation. The probability of errors, particularly among inexperienced programmers, is quite high.

Arrays are marginally faster when you're adding or removing data at the end of a list, but a list is still fairly fast. The exception is when an array gets full. Then you must allocate a bigger array, and copy all of the elements (a very slow procedure). Therefore, for arrays that grow constantly, a list will often work better.

Inserting or deleting data at the beginning or in the middle is relatively easy with a list, but quite hard with an array, because you have to move large numbers of elements around to make a gap, or fill one in.

Finding the *n*th element (where *n* is a large number) is simple with an array, but slow with a list because you have to start at the beginning count of the list and count along to the right element.

## Standard containers

The C++ STL defines two general kinds of containers: sequences and associative containers. Sequences provide simple storage, much like an array or a linked list. Associative containers provide the ability to look up data using some sort of key. A number of basic methods are available for all of the containers and some have additional, specialised methods available to them.

A *vector* is the simplest of sequences. Based on a simple array, it brings many of the strengths and weaknesses of the array with it. Adding and removing elements at the end of the vector is very efficient, using the *push\_back()* and *pop\_back()* methods. It supports insertion and deletion at other locations, but it is likely to be relatively inefficient. Listing 3 uses a vector to implement the copying program shown in listings 1 and 2.

A *list* is another sequence container based on a simple linked list. The list container supports most of the vector operations, and adds a few extra ones. The *push\_front()* and *pop\_front()* methods are handy for adding and removing data from the beginning of the list. You can add at one end and remove from the other, making the list behave like a queue rather than a stack. The *sort()* method provides simple, efficient data sorting. One notable omission is the operator *[]*. The vector allows you to access specific elements, using the operator *[]* (eg. *s = v[3];*), but the list does not support that operator. Listing 4 implements the same program using a list.

A *deque* (pronounced deck) is a double-ended queue. This is a doubly linked list that supports efficient insertion and deletion at both its beginning and end. It supports the operator *[]*, like a vector, but does not have a *sort()* method, like list containers. Listing 5 demonstrates a simple use of a deque.

There's a lot more to learn about containers, but we'll save it for next month. Until then, keep on coding.

Michael Smith can be contacted at [emmenjay@zip.com.au](mailto:emmenjay@zip.com.au). For a complete archive of APC Simple C++ columns, see <http://www.apcmag.com/simplec/>.



## C++ source code

### Listing 1: array.cpp

```
#include <iostream>
#include <string>

using namespace std;

int main()
{
    const int max=100;
    string s[max];
    int count = 0;

    while (count<max &&
           !cin.eof())
        cin > s[count++];

    for (int i=0; i<count; i++)
        cout << s[i] << '\n';

    return 0;
}
```

### Listing 2: List.cpp

```
#include <iostream>
#include <string>

using namespace std;

struct node_t {
    struct node_t *next;
    string data;
};

class CStack {
public:
    CStack() { head=0; }
    ~CStack() { Clear(); };
    bool Push(const string &s);
    bool Pop( string &s );
private:
    void Clear();
    node_t *head;
};

bool CStack::Push
    ( const string &s )
{
    node_t *n = new node_t;
    if (!n)
        return false;
    n->data = s;
    n->next = head;
    head = n;
    return true;
}

bool CStack::Pop( string &s )
{

```

```
    if (!head)
        return false;
    node_t *n = head;
    s = n->data;
    head = n->next;
    delete n;
    return true;
}
```

```
void CStack::Clear()
{
    node_t *n = head;
    while (n) {
        head = n->next;
        delete n;
        n = head;
    }
    head = 0;
}
```

```
int main()
{
    string s;
    CStack cs;
    while (getline( cin, s )
           && s.length()) {
        if (!cs.Push( s ))
            break;
    }
    while (cs.Pop(s))
        cout << s << '\n';
    return 0;
}
```

### Listing 3: vector.cpp

```
#include <iostream>
#include <string>
#include <vector>

using namespace std;

int main()
{
    string s;
    vector<string> v;

    while (getline( cin, s )
           && s.length()) {
        v.push_back( s );
    }

    while (v.size()) {
        cout << v.back()
              << '\n';
        v.pop_back();
    }
}
```

```
    return 0;
}
```

### Listing 4: list1.cpp

```
#include <iostream>
#include <string>
#include <list>

using namespace std;

int main()
{
    string s;
    list<string> l;

    while (getline( cin, s )
           && s.length()) {
        l.push_back( s );
    }

    l.sort();

    while (l.size()) {
        cout << l.front()
              << '\n';
        l.pop_front();
    }

    return 0;
}
```

### Listing 5: deque.cpp

```
#include <iostream>
#include <string>
#include <deque>

using namespace std;

int main()
{
    string s;
    deque<string> d;

    while (getline( cin, s )
           && s.length()) {
        d.push_back( s );
    }

    while (d.size()) {
        cout << d.front()
              << '\n';
        d.pop_front();
    }

    return 0;
}
```

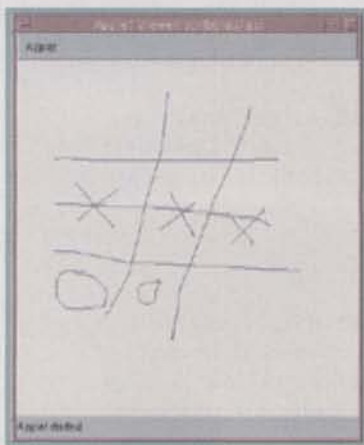
These listings can be found  
on this month's cover CD.



If you use an applet in two different Web pages, you need to know how to pass parameters to the applet. By David Williams

# Java

For some time now, we've been writing Java applets that can be run within a Web browser. The applets have always performed a specific task and have been set up in a specific way. What happens



if you want to nest an applet in two different Web pages? If these pages use different colour schemes, how do you ensure that the applet remains legible in both, without any poor colour contrasts? The solution is to let the applet read parameters that specify what its background colour should be.

We'll extend the scribble applet from last month's column to read parameters supplied by the HTML code of each page where it will be invoked. It will alter its colour scheme depending on the parameters it finds.

This allows you to use the same applet in different Web pages, with an appropriate appearance each time.

The first thing you need to do for the applet to be a successful chameleon is to supply the parameters to the applet. These parameters are placed in the HTML code where the applet will be called. Make two

parameters, and call them foreground and background. The HTML code to display the applet will resemble the code below:

```
<applet code="scribble.class"
width="400" height="400">
  <param name="foreground"
value="0000FF">
  <param name="background"
value="FFCCCC">
</applet>
```

The param tag between <applet> and </applet> is a new HTML tag that hasn't appeared in this column before. It is used once for each parameter you want to pass to the applet. Each parameter must have a name and a value. In this case, the values are going to be colours, represented here by the RGB colour numbering scheme.

## Java source code

### Listing 1: scribble.java

```
import java.applet.*;
import java.awt.*;
import java.awt.event.*;

public class scribble extends
Applet
implements MouseListener,
MouseMotionListener,
ActionListener
{
    private int prevX, prevY;

    PopupMenu popup;
    Color col = Color.black;

    public void init ()
    {
        super.init ();
        Color foreground =
getColourParameter
("foreground");
        Color background =
getColourParameter
("background");
```

```
        if (foreground != null)
        {
            setForeground
(foreground);
            col = foreground;
        }
        if (background != null)
            setBackground
(background);

        prevX = prevY = 0;
        addMouseListener (this);
        addMouseMotionListener
(this);

        popup = new PopupMenu ();
        Menu colours = new Menu
("Colour");

        String [] colNames = {
"Black", "Red", "Green", "Blue"
};
        for (int i = 0; i <
colNames.length; i++)
        {
```

```
            MenuItem mi = new
MenuItem (colNames [i]);
            mi.addActionListener
(this);
            colours.add (mi);
        }

        popup.add (colours);
        add (popup);

        private Color
getColourParameter (String
name)
        {
            String value =
getParameter (name);
            try
            {
                return new Color
(Integer.parseInt (value, 16));
            }
            catch (Exception e)
            {
                return null;
            }
        }
```



RGB stands for red, green and blue. The RGB number system defines a colour as relative intensities of these primary colours. Think of it as a digital palette for blending colours to create new ones. Black would be no red, blue or green. White, which contains every colour in the spectrum, would be red, green and blue at full intensity. Other colours would be a mix of all three at various intensities.

Hexadecimal numbers are used to represent each intensity. Hexadecimal can represent the numbers from 0 to 255 as two alphanumeric digits from 00 to FF (see APC March, page 124). So, in the colour codes on the previous page, there is a six-digit hexadecimal number. The first two digits represent the intensity of red in the colour, the second two represent green, and the final pair blue. This is how colours are represented in Java, HTML and most other languages.

The applet tags set the foreground colour (the default pen colour) to blue and the background colour (the application window) to a very light pastel colour — it is almost the colour combination required for white, but green and blue are present to slightly lesser degrees. The second task is to modify the Java code itself so that it reads

these parameters. It's one thing to make the values and pass them to the applet, but it must be able to read them.

The `java.applet.Applet` class — from which the scribble class descends — provides a method called `getParameter()` which takes in a parameter name as a string and returns the value of that parameter as a string. This is the method needed to determine what has been specified for the foreground and background colours.

To make the applet set the colour values as it starts, you need to add code to the `init()` method to retrieve these parameters and act on them.

There is one hitch: you need to use `setBackground()` and `setForeground()` — both are provided by the applet class — to make the parameter values take effect. Both expect a `java.awt.Color` object to be passed in, but `getParameter()` only returns strings. Hence, you must first write a utility function, say `getColourParameter()`, which will take in the name of a parameter, read its value and convert it to a `Color` object. To incorporate some method for error handling, make this utility function return a null if there is any problem with the parameter. For instance, the user may not supply it, or perhaps the value is not a

valid hexadecimal number. The utility function will look like this:

```
private Color getColourParameter
(String name)
{
    String value = getParameter (name);
    try
    {
        return new Color (Integer.parseInt
(value, 16));
    }
    catch (Exception e)
    {
        return null;
    }
}
```

This code introduces some new elements, but if you take it piece by piece it's not complex. First, a `String` value must be passed in to the function. The `String` value is the name of the parameter we are interested in — for example, 'foreground' or 'background'. You want to create a new `String` value, from the product of using `getParameter()` to call that parameter name. It reads the value of the parameter and assigns it to a variable called 'value'.

```
}

public void
processMouseEvent (MouseEvent
e)
{
    if (e.isPopupTrigger ())
        popup.show (this,
e.getX (), e.getY ());
    else if (e.getID () ==
MouseEvent.MOUSE_PRESSED)
    {
        prevX = e.getX ();
        prevY = e.getY ();
    }
}

public void mouseDragged
(MouseEvent e)
{
    Graphics g = getGraphics
();
    int x = e.getX ();
    int y = e.getY ();

    g.setColor (col);
    g.drawLine (prevX, prevY,
x, y);
    prevX = x;
```

```
        prevY = y;
    }

    public void mouseReleased
(MouseEvent e) {}
    public void mousePressed
(MouseEvent e) {}
    public void mouseClicked
(MouseEvent e) {}
    public void mouseEntered
(MouseEvent e) {}
    public void mouseExited
(MouseEvent e) {}
    public void mouseMoved
(MouseEvent e) {}

    public void actionPerformed
(ActionEvent event)
    {
        String command =
event.getActionCommand ();
        if (command.equals
("Black"))
            col = Color.black;
        else if (command.equals
("Red"))
            col = Color.red;
        else if (command.equals
("Green"))
```

```
        col = Color.green;
    else if (command.equals
("Blue"))
        col = Color.blue;
    }
}
```

## Listing 2: scribble.html

```
<html>
<head>
<title>Java Scribble</title>
</head>

<body>
<applet code="scribble.class"
width="400" height="400">
  <param name="foreground"
value="0000FF">
  <param name="background"
value="FFCCCC">
</applet>
</body>
</html>
```

These listings can be found on this month's cover CD.



Then you try to convert this value into a Color object. This means you have to convert value from a string into an integer. This integer is converted into a Color object. That is what the line after the try statement does.

Try lines are important for handling errors in Java. If a line of code has potential to cause a serious problem — an exception — then you put it in a try block, as we've done here. Seriously problematic lines might include those that are divisible by zero, or read from a file which is not open.

If an exception occurs, then the program does not crash; program control is passed to the catch block instead.

Here you either convert the parameter value into a Color object successfully or, if something drastic happens, you jump into the catch block which returns a null value and exits the function. Using try and catch lets you respond to serious program errors safely without aborting gracefully.

Now that the utility function has been defined, the rest of the code is very simple. You need to add some lines in the init() function to call getColourParameter() — once for the foreground and once for the background. As long as the program doesn't return null values, you now have

the information you need to set the foreground and background colours.

```
Color foreground = getColourParameter
("foreground");
Color background = getColourParameter
("background");
```

```
if (foreground != null)
{
    setForeground (foreground);
    col = foreground;
}
if (background != null)
    setBackground (background);
```

Parameters are very useful if you want your applet to be used in different contexts. Try experimenting with the scribble applet you made here. Edit the HTML file to vary the colour scheme that it uses, and then reload it within your browser. The applet's colour scheme should change without having to make any changes to the program code.

Imagine all the other things you could do with parameters. You could use them to pass text messages into an applet. Soon you will learn how to load and display GIF



images in your applets; you could use each file's textual path and filename identifiers as parameters. Extending that logic, if the applet's background was a picture and it used images buttons, then you could tailor the applet so it changes appearance if you alter the parameters you pass to it.

David Williams can be contacted at [dave@qed.newcastle.edu.au](mailto:dave@qed.newcastle.edu.au). For a complete archive of APC Java columns, see <http://apcmag.com/java/>.

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Tips for table formatting, plus three handy pieces of code to make your site more useful. By Angus Kidman

# Insite

**H**TML's table tags are one of its most utilised features, although relatively few designers use them simply to present data in a tabular format (as we did in last month's Insite column). Most Web developers use tables to format page elements in more precise ways than would otherwise be possible. This can pose a significant problem for disabled people who use text-to-speech screen reader software, as it can't readily interpret the relationship of one table cell to the next. However, it has become the dominant formatting technique in Web design.

Used intelligently, tables can make a site easier to navigate and simpler to modify, but used without careful forethought, they can create a site that's slow to render and a nightmare to update. WYSIWYG Web editors often exacerbate the problem by making bizarre choices when trying to convert onscreen designs into functional table formats. To ensure that your tables are tasty rather than tragic, follow these rules.

## 1. Plan on paper before you start.

If you're planning to use a table with more than one cell in it, then it's worth doing a sketch of it on paper before you start writing your HTML code. It's very hard to keep track of multiple row and column spans in your head, and not all Web design tools do a good job either. You can do elaborate plans using flow-chart or spreadsheet tools, but for most applications, pencil and paper are fine. See 'Planning a table' on page 152 for one simple example.

## 2. Build the structure, then add the content.

Don't try and incorporate every design element at once when you're using tables for layout purposes. Build a simple table and fill it with dummy text. Use different background colours in each cell if you want to be sure the table is behaving as you expect.

It's much easier to troubleshoot a page that isn't over-burdened with content, font formatting tags and other details that don't affect basic table ren-

dering. Such pages are also useful as templates when you roll out new pages.

## 3. Don't embed too many tables.

It's often tempting to include multiple tables within other tables, especially if you're planning a complex page with different cell spacing and border requirements. However, heavily embedded tables are often slow to render, and keeping track of which table is where can become difficult. When you do embed tables, use indents so you can quickly identify the individual table elements.

## 4. Break up tables for faster rendering.

If your page features several complicated table rows, render each one as a separate table rather than as rows in a main table. This will result in faster page rendering, because the first table will display before the second, and so on, rather than forcing your browser to calculate rendering details for the entire table. Specifying table cell widths can also speed up the rendering of pages, especially if you plan to include images.

## 5. Learn the attributes, and use them.

The <table>, <tr> and <td> tags all have a large number of attributes that affect the way they render. We've listed the most useful options (see 'Common table attributes' below), but nothing beats experimentation for learning which tags are useful to you. At the same time, don't include every possible attribute in every table formatting tag (that's what FrontPage is for). In practice, it's more usual to format <td> tags than <tr> tags, but it's possible to do both.

## 6. Don't overformat.

Because text formatting isn't persistent between table cells, aim for the smallest number of attributes when formatting text within a table — just demanding a specific font can double or triple the size of your page, making it slower to load.

## 7. Test in multiple browsers.

Tables highlight some of the most obvious differences between Netscape and Internet Explorer. What looks insanely clever in one can look ridiculously naff in the other.

## Common table tag attributes

Attribute	Acceptable values	Function
<b>Attributes for &lt;table&gt;</b>		
align	LEFT or RIGHT	Sets alignment of table on page
background	URL of image	Sets table background image
bgcolor	Colour name or code	Sets table background colour
border	Integer	Sets border thickness
cellpadding	Integer	Sets space from edge of cell to data, in pixels
cellspacing	Integer	Sets space between cells, in pixels
width	Integer	Width of table, in pixels or as a percentage
<b>Attributes for &lt;tr&gt;</b>		
rowspan	Integer	Sets number of rows for column to span
<b>Attributes for &lt;td&gt;</b>		
align	LEFT, RIGHT, JUSTIFY or CENTER	Sets horizontal text alignment
bgcolor	Colour name or code	Sets cell background colour
colspan	Integer	Sets number of columns for row to span
valign	BASELINE, BOTTOM, MIDDLE or TOP	Sets vertical text alignment
width	Integer	Width of cell, in pixels or as a percentage



## Planning a table

	table		
tr	td colspan = 3 Heading		
tr	td rowspan = 3  Directory	td Highlight 1	td Highlight 2
tr		td colspan = 2 Search	
tr		td colspan = 2 Contact	
	table		

### 8. Don't skip tags.

Tables are unforgiving if you miss an opening or closing tag — much more so than most other HTML elements. If your table consistently fails to appear at all, then you've probably missed a closing tag somewhere. Check your code on paper thoroughly, or use an HTML checking tool.

## Code library

One of the most attractive features of Web design is the ability to borrow and adapt ideas from other sites. Very few people who have developed a site could honestly claim they haven't used or viewed the source of an impressive HTML page to discover the secrets of its design. This practice is particularly prevalent when advancing from designing straightforward, exclu-

sively HTML pages to those with more sophisticated features such as scripts.

Even if you have no desire to learn JavaScript, or some of the more esoteric extensions available to HTML tags, having an arsenal of such resources can be very handy for enhancing your Web sites. Below are three useful pieces of code which can easily be modified to suit your own needs with a little cunning. All of them are currently being used on various sites in the **apcmag.com** empire, so they've been tried and tested for compatibility with a wide range of browsers.

All the code can be found on this month's cover CD, ready for copying and modifying. And if all this whets your appetite for learning more about scripting, APC's JavaScript tutorial (at <http://apcmag.com/javascript/>) is a great place to begin.

## Drop-down menus

```
<form>
<select name="newPage" width=100>
<option value="URL">Menu Option 1
<option value="URL">Menu Option 2
<option value="URL">Menu Option 3
</select>
<input type="button" value=" Go "
onClick='window.top
.document.location.href=this.form.
newPage.options[this.form.newPage.
selectedIndex].value;'>
</form>
```

Drop-down menus are useful when you want to place a lot of options on a page, but don't want to consume too much space with endless listings. To use the menu code above, simply replace URL with the address of the page that users will access, and Menu Option X with whatever text you want to appear. You can add as many options as you like. Similarly, the word Go can be replaced with any text you like, while the width option can be adjusted as required. Any formatting options you want to apply should be placed before the initial `<form>` tag.

## Automatic redirects

```
<META http-equiv="Refresh"
content="0; url=URL">
As long as your browser supports the
```

Refresh function (not a problem with releases from either Microsoft or Netscape since version 4.0), you can automatically divert users from one page to another by using the above line. Simply replace URL in the line of code above with the page you want to divert people to. Current browsers will handle the diversion correctly, but if you're worried about users with earlier versions, you should also add a conventional link of 'Click here for our new site'. However, this can slow down the actual diversion, so keep such pages simple.

## Pop-up windows

```
<script language="JavaScript">
<!--
function wOpen(url, width, height, name)
{
var fList =
'toolbar=no,scrollbars=yes,status=yes,width
=' + width + ',height=' + height;
window.open(url, name, fList);
}
function opensearchquery()
{ wOpen("URL", 400, 400,
"WindowName");
}
//-->
</script>
```

If you want to provide small pieces of related information (such as definitions, additional help or a simple mail-in form) without forcing users to leave a page, pop-up windows are a useful option.

The first section of code should be placed near the top of any page you want a pop-up link in. Replace URL with the address of the actual content you want to pop up; the two 400s with the width and height you want for the pop-up windows; and WindowTitle with the title. Then use this second piece of code in place of a normal anchor tag to provide the link:

```
<a href="javascript:opensearchquery();">
Link text here</a>
```

Don't overuse pop-up windows, and resist the urge to have windows that appear automatically without users clicking anywhere; this will annoy them and give your site the feel of a cheap porn emporium.

Angus Kidman can be contacted at [akidman@acptech.net](mailto:akidman@acptech.net). For a complete archive of APC Insite columns, see <http://apcmag.com/insite/>.

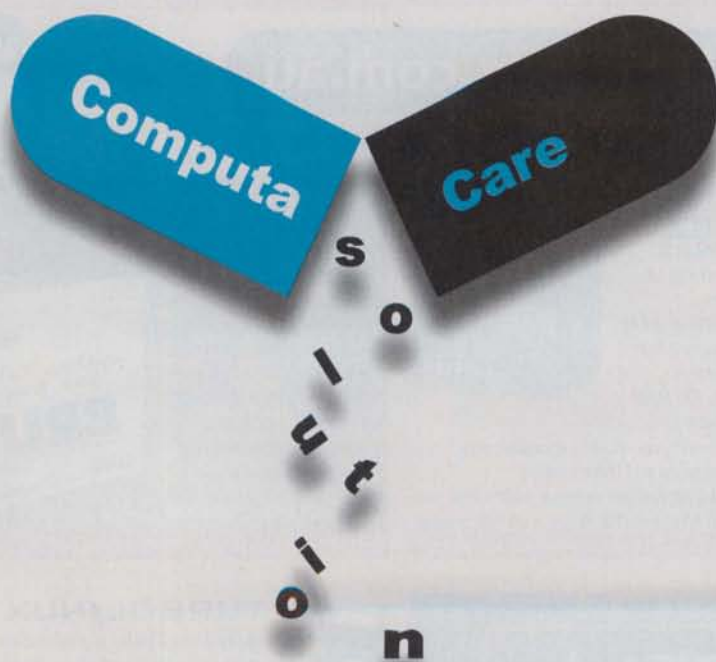
## About Insite

Insite is a new monthly Workshop column that examines techniques and strategies for building effective Web sites. It explores everything from basic tips and tricks for enhancing sites to advanced features such as database integration.

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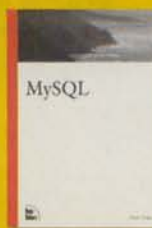


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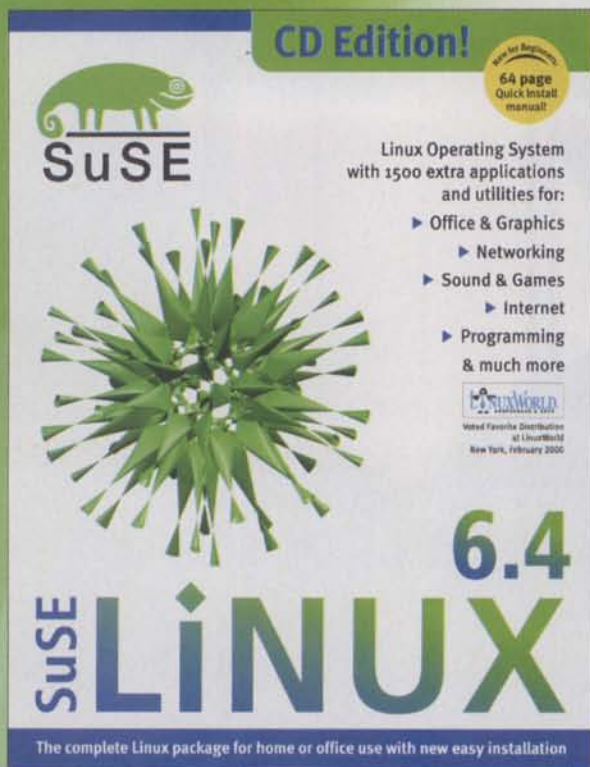
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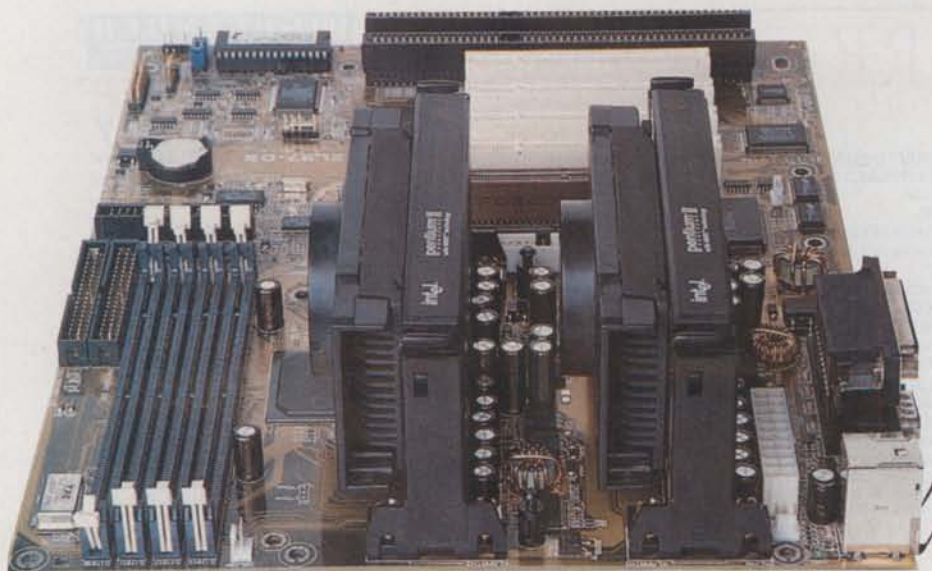
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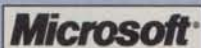
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16  
45  
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8  
12  
12  
12  
6  
6  
12

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21-BKL  
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4-BKL  
5-BKL  
19-BKL  
18-BKL  
46-BKL  
8A-BKL  
8B-BKL  
29-BKL  
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3x12  
3x3  
3x3  
3x4  
3x12  
3x12  
3x12  
3x6  
3x6  
12/Colour

Kit Code

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25-CLR  
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47-CLR  
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GE-00097CMY	S020097	Epson Stylus Colour 200/500	\$24.00
GE-00108BK	S020108	Epson Stylus Colour 800/1520	\$20.00
GE-00089CMY	S020089	Epson Stylus Colour 400/600/800/1520	\$24.00
GE-00110CMY	S020110	Epson Stylus Colour Photo 700/Photo ex	\$28.00
GE-00187BK	S020187	Epson Stylus Colour 440/460/640/660	\$19.00
GE-00189BK	S020189	Epson Stylus Colour 740/760	\$20.00
GE-00191CMY	S020191	Epson Stylus Colour 440/460/640/660/740/760	\$28.00
GE-00036CMY	S020036	Epson MJ-700V/900C/5000C Stylus Pro	\$35.00
GE-00034BK	S020034	Epson MJ-700V/900C/5000C Stylus Pro	\$30.00
GE-00047BK	S020047	Epson stylus / Colour 200/II/Is/820; STYLUS - 200/820	\$20.00
GE-00049CMY	S020049	Epson Stylus / Colour II/Is/820/1500/1500K	\$25.00
GE-00118BK	S020118	Epson Stylus / Colour 3000 and Epson Stylus Pro 5000	\$35.00
GE-00122Y	S020122	Epson Stylus Colour 3000 and Epson Stylus Pro 5000	\$36.00
GE-00126M	S020126	Epson Stylus Colour, MJ-8000C	\$36.00
GE-00130C	S020130	Epson stylus Colour, MJ-8000C	\$36.00
GE-00062BK	S020062	Epson Stylus Colour 1500/1500K, MJ/850K/1500K/3000C	\$30.00
GE-000138CMY	S020138	Epson Stylus Colour 300	\$30.00
GE-00193CMY	S020193	Epson Stylus Photo 750	\$35.00
GE-00010BK	S020010	Epson SQ 870/1170	\$36.00
GE-0T001CMY	T001011	Epson Stylus Photo 1200	\$28.00
GE-0T003BK	T003011	Epson Stylus 900/900N	\$20.00
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GC-00201C	BJI-201C	CANON BJC-600/610/620/630	\$9.00
GC-00201M	BJI-201M	CANON BJC-600/610/620/630	\$9.00
GC-00201Y	BJI-201Y	CANON BJC-600/610/620/630	\$9.00
GC-00201BK	BJI-201BK	CANON BJC-600/610/620/630	\$9.00
GC-00010BK	BCI-10BK	CANON BJ-30/35/50/70/80/BN700	\$10.00
GC-00011BK	BCI-11BK	CANON BJ-30/35/50/70/80	\$10.00

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Intel Celeron 466A (370)	\$172
Intel Celeron 500A (370)	\$182
Intel Celeron 533A (370)	\$234
Intel Celeron 566A (370)	\$259
Intel Celeron 600A (370)	\$280
Intel Celeron 633A (370)	\$344
Intel Celeron 667A (370)	\$472
Intel Pentium III 550E (370)	\$460
Intel Pentium III 600EB (370) 133	\$550
Intel Pentium III 650 (370)	\$600
Intel Pentium III 667 (370) 133	\$625
Intel Pentium III 700 (370)	\$780
Intel Pentium III 733 (370) 133	\$835
Intel Pentium III 750 (370)	\$1,120
Intel Pentium III 800EB (370) 133	\$1,170
Intel Pentium III 850 (370)	\$1,190
Intel Pentium III 866 (370) 133	\$1,820
AMD K6-2 450 3D (oem) (s-7)	\$123
AMD K6-2 500 3D (oem) (s-7)	\$136
AMD K6-3 400 3D (oem) (s-7)	\$174
AMD Athlon K7-600 3D (oem) (Slot A)	\$450
AMD Athlon K7-650 3D (oem) (Slot A)	\$510
AMD Athlon K7-700 3D (oem) (Slot A)	\$595
AMD Athlon K7-750 3D (oem) (Slot A)	\$835
AMD Athlon K7-800 3D (oem) (Slot A)	\$1,225
AMD Athlon K7-850 3D (oem) (Slot A)	\$1,275
AMD Athlon K7-900 3D (oem) (Slot A)	\$1,876

## MOTHERBOARDS

Abit BE6 (V2) BX, U66	\$262
Abit BP6, BX, U66 (370 dual)	\$262
Aspen AX59 PRO, IM (s-7)	\$173
Aspen AX63 PRO VIA 133	\$180
ASUS P3VIA U-66	\$178
ASUS P3C2000, 820 U-66 (VGA) 133	\$339
ASUS P3C-DI 820 U-66 (Dual) 133	\$825
ASUS P2BDS, BX, U66 (L2W SCSI)	\$883
ASUS K7VIA KX, U66	\$338
Epox 584P3C2 VIA U-66 (s-7) AT	\$207
Epox 511MP3S3 VIA U-66, 2M (s-7)	\$207
PCVIA-503+ IMB (s-7) AT	\$145
PC KAI I VIA U66 (audio) 133	\$221
PC SDI I VIA68, U66 (Slot A)	\$230
Intel C820, 820, U66 133	\$268
Gigabyte 5AAALLS12K (s-7) AT	\$149
Gigabyte 6BX, BX	\$175
Gigabyte 6VX7-4X VIA (4X AGP)	\$210
Gigabyte 6BX2000+ BX (Dual Bios)	\$239
Gigabyte 6KXC-K, 820, U66 (Dual Bios)	\$262
Gigabyte 6BX2000 BX (Dual)	\$290
Gigabyte GA-71X U66 (Slot A)	\$334
MS-6195, AMD750, U66 (Slot A)	\$262
PCchip M7461 (8M VGA, Audio, 56K, 10/100)	\$155
SuperMicro P8IDMB, 840 (Dual U3W SCSI)	\$1,311

## VIDEO &amp; GAMES CARDS

Imega 250M Zip Ext. Parallel / SCSI	\$305
Imega 250M Zip Ext. USB	\$343
Castlewood 2.2G ORB Int. IDE	\$399
Castlewood 2.2G ORB Ext. SCSI	\$457

4M Eagle S3TRIO 32/2X AGP VGA card	\$52
8M Eagle S3TRIO 32/2X AGP VGA card	\$63
16M Video Excel TNT2 M 64	\$125
32M Asustek V3800 TNT2/TV I/O Ultra	\$386
32M Asustek V6000 GeForce pure	\$465
32M Asustek V6000 GeForce TV DLX	\$590
32M Asustek V6000 GeForce DDR pure	\$558
32M Aopen PA3030G TNT2/TV Ultra	\$370
32M Creative Blaster GeForce	\$484
32M Creative Blaster GeForce PRO DDR	\$574
32M Diamond Viper II Z300 S2 Savage	\$360
64M Diamond Viper II S3 S2000 Extreme	\$513
32M Leadtek Winfast GeForce TV (real)	\$480
32M Millennium G400 Dual Head (oem)	\$378
32M Millennium G400 Dual Head MAX	\$448
16M Millennium G400 Marvel TV/DVD	\$662
16M Voodoo 3 3000 166MHz TV AGP	\$220
16M Voodoo 3 3500 183MHz TV I/O	\$222

## MONITORS

Mitsubishi DView 1554 15", 28" 1024x768	\$267
Mitsubishi DView 1770 17", 27"	\$419
Mitsubishi DView 1772 17", 27"	\$514
Mitsubishi DView 1995 19", 26" 1600x1280	\$1,045
Acer 54E 15", 28" 1024x768 66Hz	\$270
Acer 77 17", 27" 1280x1024 60Hz	\$421
Acer 99C 19", 26" 1600x1200 75Hz	\$1,120
CTX PR711 17", 25" 1600x1280 (Trinitron)	\$724
CTX VL90 19"	\$835
Hiachi CM1615 17", 24" 1280x1024 (New)	\$510
Hiachi CM1650 17", 21" 1280x1024 (Short)	\$660
Hiachi CM1643 17", 21" 1600x1200 (Pro)	\$755
Hiachi CM1715 17", 22" 1600x1200	\$1,013
Hiachi CM1769 19", 21" 1800x1350	\$1,303
Hiachi CM1811 21", 22" 1600x1280	\$1,926
Hiachi CM1813 21", 22" 1600x1280	\$2,136
LG 795FT 17", 25" Flatron	\$817
NEC MultiSync V520 15", 28" 1280x1024	\$308
NEC MultiSync V720 17", 28" 1280x1024	\$481
NEC MultiSync E750 17", 25" (Short)	\$671
NEC MultiSync E950 19", 25" (Short)	\$1,192
NEC MultiSync E1100+ 21", 28" 1600x1280	\$1,987
Panasonic E70 17", 27" 1280x1024 60Hz	\$468
Panasonic SL75 17", 27" 70Hz (Short)	\$597
Panasonic PL70 17", 22" 1600x1280 73Hz	\$712
Panasonic SL85 19", 27"	\$1,079
Panasonic S110 21", 25" 1600x1240	\$1,642
SONY E100 15", 24-25" (Flat Trinitron)	\$460
SONY E200 17", 24-25" (Flat Trinitron)	\$738

## SOUND CARDS

HP 9200e (8x4x32) Ext. SCSI + Soft + Media	\$870
Mitsubishi (6x4x30) IDE + Soft + Media	\$385
Mitsubishi (8x4x30) IDE + Soft + Media	\$633
Rioch (8x4x32) 7080A IDE + Soft + Media	\$508
Rioch (6x4x24x4) 9060A DVD-CDRW IDE	\$644
Sony (8x4x32) 1401 IDE (oem)	\$430
Yamaha (8x4x24) IDE (oem)	\$420
Yamaha (8x4x24) SCSI (oem)	\$548

Sound Blaster Vibra 128 (oem)	\$53
Sound Blaster LIVE (oem)	\$113
Sound Blaster LIVE Player	\$176
Sound Blaster LIVE Platinum - Optical	\$114
Diamond Monster Sound Mx400 (oem)	\$121
Xtreme Storm Platinum (oem)	\$190
Xtreme Storm Platinum (retail + force telephone)	\$190

## SPEAKERS

Altec Lansing ACS22 - 2p	\$59
Altec Lansing ACS33 - 3p	\$87
Altec Lansing ACS45.1 Power Cube - 3p	\$180
Altec Lansing ACS54 Gamers - 5p	\$210
Cambridge PCWorks Speaker - 3p	\$114
Cambridge PCWorks 4Pc FPS 1000	\$223
Cambridge Soundworks 4Pc FPS 2000	\$389
Cambridge Desktop 6Pc DT2500D	\$678
Logitech SoundPlan G1	\$73
Yamaha YST-M330 Subwoofer + Speakers	\$130
Yamaha YST-M335 Sub + Speakers USB	\$164

## PRINTERS

Brother HL-1240 12ppm 2M	\$574
Samsung ML-5000A 8ppm	\$565
Canon BJC-2655SP	\$128
Canon BJC-2000SP 5ppm	\$166
Canon BJC-3000	\$254
Canon BJC-5100 (A4+)	\$341
Canon BJC-6000 8ppm (1440x720)	\$360
Canon BJC-6500 8ppm (1440x720)	\$360
Canon BJC-1100 (1200x600)	\$500
Canon LBP800V 8ppm	\$530
Epson Stylus Color 670 (1440x720) (+USB)	\$195
Epson Stylus Color 670 (1440x720)	\$298
Epson Stylus Color 860 (1440x720)	\$467
Epson Stylus Color 900 (1440x720) (+USB)	\$555
Epson Stylus Photo 700	\$395
Epson Stylus Color 1160 (A3+)	\$813
Epson Stylus Photo 1270 (A3)	\$914
HP Deskjet 610C	\$202
HP Deskjet 810C	\$296
HP Deskjet 930C	\$405
HP Deskjet 980C	\$379
HP Deskjet 970C	\$738

## PCMCIA

LightSpeed 56k Rodwell pcmcia modem	\$150
Netcomm Card Modem 56K (oem)	\$237
Xicom RealPort Value Modem 56K	\$239
D-Link PCMCIA 10/100 DFE-650TX	\$193
Xicom PC Card Ethernet 10/100	\$274
Netcomm CardModem Enet 10 + 56K	\$264
Xicom RealPort Enet 10/100 + 56K GSM	\$607
Xicom RealPort Enet 10 + 56	\$547
Adaptec Cardbus 1480 SCSI - Honda 50	\$340
Adaptec USB2000 USB to SCSI converter	\$152

## DIGITAL CAMERAS &amp; MP3'S

Agfa Ephoto 780C 1024x768	\$448
Agfa Ephoto CL30 1440x1080 4Pb	\$777
Canon PowerShot A50	\$1,123
Canon PowerShot S10	\$1,398
HP PhotoSmart C30 1152x872 with 4Pb	\$679
Kodak DC-215 4Pb	\$446
Kodak DC-215 8Pb	\$731
Kodak DC-240	\$974
Kodak DC-265 premium	\$1,543
Kodak DC-280	\$1,288
Sony Digital Mavica Camera -FD73	\$1,057
Sony Digital Mavica Camera -FD83	\$1,526
Diamond Rio 500 64Mb (green/gray/purple)	\$524
Creative Nomad MP3 player 64Mb	\$565

## TV TUNERS, VIDEO CAPTURE &amp; CONF.

Dynalink TV Tuner PCI + FM radio	\$141
Hauppauge WinTV USB	\$262
Hauppauge WinTV GO PCI	\$163
Kodak DVC-325 Digital Video Camera USB	\$223
Logitech QuickCam Express USB	\$82
Logitech QuickCam Pro Parallel / USB	\$240
Pinnacle Studio DC10 Plus	\$632
Pinnacle Studio MP10	\$608
Miro Video DV200	\$1,046
Miro Video DV500	\$1,760
DV Raptor Premier LE	\$1,310

## IDE &amp; SCSI CARDS

Promise U-66 + cable (oem)	\$80
Promise FastTrak-66 + cable (retail)	\$312
Adaptec 2930 PCI (oem)	\$116
Adaptec 2930 U PCI (Kit)	\$200
Adaptec 29160 U160 64-bit PCI (oem)	\$499
Adaptec 29160 U160 64-bit PCI (Kit)	\$699

## TAPE BACK-UP

Exabyte TR4 48G IDE	\$304
Onstream 30GB Inc. IDE 2Mls	\$579
Onstream 30GB Inc. SCSI 2Mls	\$1,344
Seagate 20GB Travan IDE Tape Kit	\$629

## FEATURE PRODUCTS



## MOTHERBOARDS

Aspen AX64 PRO VIA 133A	\$220
ASUS P3VIA VIA U-66 (new) 133	\$220
Epox 70X VIA U-66 (Slot A) 133	\$262
Gigabyte 6VX7+VIA U66 S370	\$165
SuperMicro P8IDMB, (Dual ide)	\$635

## MEMORY

64MB SDRAM PC100 168pin	\$122
128MB SDRAM PC100 168pin	\$147
256MB SDRAM PC100 168pin	\$354
64MB SDRAM PC133 168pin	\$129
128MB SDRAM PC133 168pin	\$254
256MB SDRAM PC133 168pin	\$560
32MB EDO SIMM 72 pin 168pin	\$135

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13.6Gb Seagate Medallist U-66	\$246
10Gb Quantum FB LM U-66 7200	\$288
15Gb Quantum FB LM U-66 7200	\$323
30Gb Quantum FB LM U-66 7200	\$563
15.0Gb WD Caviar U-66 2M 7200rpm	\$302
20.5Gb WD Caviar U-66 2M 7200rpm	\$403
27.3Gb WD Caviar U-66 2M 7200rpm	\$494

## HARD DISKS - NOTEBOOK

4.8Gb Fujitsu M184 9.5mm	\$312
6.4Gb Fujitsu M184 9.5mm	\$409

## HARD DISKS - SCSI

9.1Gb Quantum Atlas IV LVD68	\$502
18.2Gb Quantum Atlas IV LVD68	\$821
36.4Gb Quantum Atlas IV LVD68	\$1,635
9.1Gb Quantum Atlas 10k LVD68	\$706
18.2Gb Quantum Atlas 10k LVD68	\$1,145
36.4Gb Quantum Atlas 10k LVD68	\$2,044
9.1Gb Seagate Barracuda LVD68 9.5mm	\$595
36.4Gb Seagate Barracuda LVD68	\$1,750
50.1Gb Seagate Barracuda LVD68	\$2,010
9.1Gb Seagate Chevelle LVD68 9.5mm	\$800
18.2Gb Seagate Chevelle LVD68	\$1,230
36.4Gb Seagate Chevelle LVD68 9.5mm	\$2,140

## FDD &amp; STORAGE DEVICES

LS120 Superdisk Ext. IDE (oem)	\$126
LS120 Superdisk Ext. IDE (oem)	\$248
Imega 100M Zip Ext. IDE (oem)	\$130
Imega 100M Zip Ext. Parallel / SCSI	\$210
Imega 100M Zip Ext. Parallel + 4 disks	\$283
Imega 250M Zip Ext. IDE (oem)	\$268
Imega 250M Zip Ext. IDE (oem)	\$208

## HARD DISKS - IDE

8.6Gb Seagate Medallist U-66	\$200
17.0Gb Seagate Medallist U-66	\$281
20Gb Quantum FB LM U-66 7200	\$368
13.6Gb WD Caviar U-66 2M 7200rpm	\$292
18.4Gb Seagate Barracuda LVD68 9.5mm	\$771

## SONY G400 19", 24-25" (Flat Trinitron)

SONY G500 21", 24" (Flat Trinitron)	\$2,326
Viewsonic E70 17", 27" 1280x1024	\$461
Viewsonic E790 19", 26" 1600x1280	\$916

## LCD MONITORS

Acer P551 15" TFT 1024x768	\$1,980
Hiachi CHL150XE 15" TFT Monitor	\$2,420
Mitsubishi TFT 18" TFT 1800x1280	\$6,559
"NEC LCD1525V 15" 1024x768	\$2,261
NEC LCD1525M 15" 1024x768 Multimedia	\$2,173
Panasonic 15" LC50S 0.25dp USB + Spkr	\$2,216
SONY CDP151 15.1" TFT Monitor	\$2,713
Viewsonic 15" LCDVG150 1024x768	\$2,194

## KEYBOARDS, MICE &amp; JOYSTICKS

Honeywell Spacemate II Din-5&PS2	\$48
Logitech Internet Keyboard PS2	\$52
Logitech Cordless Desktop Touch (K/btrm)	\$162
Logitech Cordless Desktop Pro (K/btrm)	\$210
Microsoft Internet Keyboard PS2 (oem)	\$49
Microsoft Ergonomic Elite PS2	\$58
Microsoft Natural Keyboard Pro PS2&USB	\$100
Logitech Class Wheel Mouse (Serial/PS2)	\$90
Microsoft IntelliMouse Explorer USB&PS2	\$91
Logitech WingMan Extreme Digital 3D	\$79
Logitech WingMan Force (USB)	\$173
Logitech WingMan Formula Force	\$276
Microsoft SideWinder Force Feedback + Sw	\$224
Microsoft SideWinder Force Feedback Wheel	\$288

## CD ROM

44x IDE/ATAPI CDROM drive	\$75
48x Aopen IDE CDROM drive	\$90
50x Mitsubishi IDE CDROM drive	\$105

## DVD ROM

Aopen 10x DVD 40xR	\$240
Creative Ext. DVD (oem)	\$240
Pioneer 6x DVD 32xR Slot (oem) SCSI	\$334
Pioneer 16x DVD 40xR	\$255
Hiachi 52x DVD RAM SCSI Drive	\$933

## CD REWRITERS

HP 9100 (8x4x32) IDE + Soft (oem)	\$454
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## VIDEO &amp; GAMES CARDS

32M Video Excel TNT2 M 64	\$165
32M Asustek V6000 GeForce TV DDR DLX	\$623
32M Leadtek Winfast GeForce DDR (real)	\$560
16M Millennium G400 Dual Head (oem)	\$272
16M Voodoo 3 2000 143MHz PCI / AGP	\$199

## HP Deskjet 1120C (A3)

HP Officejet 635C 4 in 1	\$595
HP Officejet 725 4 in 1	\$660
HP PhotoSmart 8100m Printer	\$744
HP LaserJet 1100 8ppm	\$772
HP LaserJet 2100	\$1,340
HP LaserJet 4050	\$2,200
HP LaserJet Colour 4500	\$5,279
HP LaserJet 5000 A3	\$2,897
HP LaserJet 8000	\$4,632
HP LaserJet 8100	\$5,179
Kyocera FS680 4M PCL5e	\$594
Kyocera FS5900C Colour 48M PCL5e, PS	\$4,324
Panasonic KX-P6100	\$320

## SCANNERS

Acer 320P EPP (300x600)	\$120
Acer 620U USB (600x1200)	\$155
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Agfa Snapscan 1212U USB (600x1200)	\$261
Canon CanoScan FB 330 P	\$136
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Canon CanoScan FB 630 USB	\$218
Canon CanoScan FB 1200	\$889
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Epson Perfection 1200 USB	\$209
Epson Perfection 1200 SCSI	\$259
HP Scanjet 3200C EPP	\$139
HP Scanjet 3300C USB	\$149
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- 104-Key Windows PS/2 Keyboard
- Logitech 3 Button Mouse
- Creative 8x DVD 40x CD-Rom Drive
- Creative Sound Blaster Vibra Soundcard
- 480W PMPO Speakers
- 56K V90 Internal Modem
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- Acer 340P Scanner
- Windows 98 on CD installed and configured



**PRICE**  
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- 250W ATX Midi Tower Case
- Logitech Internet or Honeywell Spacemate II PS/2
- Logitech Wheelmouse or Microsoft Intellimouse PS/2
- Sound Blaster Live or Xitel Storm Platinum Soundcard
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- Windows 98 on CD installed & configured

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<b>K7-700</b>	<b>\$2700</b>
<b>K7-750</b>	<b>\$2940</b>
<b>K7-800</b>	<b>\$3320</b>
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- 180W PMPO Stereo Speakers
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- 1.44Mb 3.5" Floppy Disk Drive
- 8Mb S3 Trio 32/2X AGP Video Card
- 250W ATX Midi Tower Case
- 104-Key Windows PS/2 Keyboard
- Logitech 3 Button Mouse
- 44X CD-ROM Drive
- Genuine Sound Blaster Vibra Soundcard
- 480W PMPO Speakers
- 56K V.90 Internal Modem
- Windows 98 on CD Installed & Configured

<b>PRICE</b>	<b>Cel-466</b>	<b>\$1180</b>
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- 1.44Mb 3.5" Floppy Disk Drive
- 32Mb Riva TNT2 Video Card
- 250W ATX Midi TowerCase
- Logitech Internet or Honeywell Keyboard
- Logitech Wheel Mouse or MS Intellimouse
- Creative 8x DVD 40x CD-ROM Drive
- Sound Blaster Live or Storm Platinum Soundcard
- 600W PMPO 3 point Stereo Speakers
- 56K V90 Internal Voice/Fax/Data Modem
- Windows 98 on CD installed and configured

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	<b>PIII-650</b>	<b>\$2130</b>
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	<b>PIII-750</b>	<b>\$2660</b>

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- 1.44Mb 3.5" Floppy Disk Drive
- 32Mb Matrox Millennium G400 Dual Head Video Card
- 250W ATX Midi TowerCase
- Logitech Internet or Honeywell Keyboard
- Logitech Wheel Mouse or MS Intellimouse
- Pioneer 16x DVD, 40x CD-ROM Drive
- Sound Blaster Live or Storm Platinum SoundCard
- Altec Lansing ACS22 Stereo Speakers
- 56K V90 Internal Voice/Fax/Data Modem
- Windows 98 on CD Installed & Configured

<b>PRICE</b>	<b>PIII-550</b>	<b>\$2330</b>
	<b>PIII-600</b>	<b>\$2430</b>
	<b>PIII-667</b>	<b>\$2250</b>
	<b>PIII-733</b>	<b>\$2710</b>
	<b>PIII-800</b>	<b>\$3240</b>

For personal configurations, visit our website and select the System Builder.

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Prosignia 1600 PIII 500 64MB 12GB 6 x DVD 14.1" TFT 56K TV out Win98	\$4,460
Armada 1500C P400 celeron 32MB 4GB 24 x CD 12.1" TFT Win95	\$2,525
Armada V300 P400 celeron 32MB 6GB 24 x CD 12.1" Passive 56K F/M Win98	\$2,425
Armada V300 P500 celeron 64MB 6GB 24 x CD 14.1" TFT 56K Win98	\$3,765
Armada E500 PIII 500 64MB 6GB 24 x CD 12.1" TFT 56K F/M Win NT	\$3,745
Armada E500 PIII 500 64MB 6GB 24 x CD 12.1" TFT 56K F/M Win98	\$3,545
Armada E500 PIII 450 64MB 12GB 24 x CD 14.1" TFT 56K F/M Win98	\$4,500
Armada E500 PIII 600 64MB 12GB 24 x CD 14.1" TFT 56K F/M Win98	\$4,845
Armada E500 PIII 600 64MB 12GB 24 x CD 14.1" TFT 56K F/M Win NT	\$4,985
Armada E500 PIII 650 64MB 12GB 24 x CD 14.1" TFT 56K F/M Win98	\$5,490
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Satellite 2180 AMD475 64MB 4GB 24 x CD 12.1" TFT 56K Win98	\$2,979
Satellite 2670 Pentium III 450 64MB 6GB 4 x DVD 12.1" TFT 56K Win98	\$3,700
Satellite 4090XCDT P400MHz celeron 64MB 6GB 24 x CD 14.1" TFT 56K	\$3,700
Satellite Pro 4280XVD Intel PIII 500MHz 64MB 6GB 6 x DVD 14.1" TFT 56K	\$5,020
Satellite Pro 4220XVD Intel PIII 600MHz 64MB 12GB 6 x DVD 14.1" TFT 56K	\$5,630
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Tecra 8100 Pentium III 500 64MB 12GB 24 x CD 56K F/M 14.1" TFT Win98 CD	\$6,135
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CANON LBP 800 Laser Printer 600dpi 8ppm	\$520
EPSON 670 Printer	\$283
EPSON 760 Printer	\$445
EPSON Photo 700	\$399
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ASUS V6600 Geforce 32MB Deluxe AGP	\$565
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KINGMAX PCMLA 10/100 Network Card	\$99
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ACER 8 Port 10/100 Mbps Ethernet Hub	\$199
NETGEAR 8 Port 10/100	\$280
NETGEAR 16 Port 10/100 Dual Speed Hub Ds116	\$480
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GA 6WMM7 Intel 810 M'Board Built in SVGA & Sound	P533 celeron	\$1,190
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## TIBX System 2

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Gigabyte Intel 820 Chipset Motherboard With Audio Built in	PIII 550	\$2,135
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56K Netcom Roadster External Serial F/M	\$195
56K Netcom USB F/M	\$195
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ARTEC AM12E Plus 600 x 1200dpi Parallel Scanner	\$110
ARTEC Ultima 2000 600 x 1200dpi USB Scanner	\$125
ARTEC SCSI Scanner AM12S 3D Scanning Solution	\$145
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Hp5300 Scanner	\$525
Hp6300 1200dpi 36Bit Colour USB & SCSI	\$735
CANON FB 630P 600 x 1200dpi Parallel 36Bit	\$175
CANON FB 630U 600 x 1200dpi USB	\$216

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RJ45M-RJ45M Cat5 UTP Network Cable 10m	\$12
RJ45M-RJ45M Cat5 UTP Network Cable 20m	\$25
RJ45M-RJ45M UTP Cat5 Cable 2m Crossover Connection	\$6
RJ45M-RJ45M UTP Cat5 Cable 5m Crossover Connection	\$8
RJ45M-RJ45M UTP Cat5 Cable 10m Crossover Connection	\$15
RJ45M-RJ45M UTP Cat5 Cable 20m Crossover Connection	\$25

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GA 6WMM7 Intel 810 Built in SVGA & Sound Sup ATA66	\$175
GA 6BC7 Motherboard Intel BX Chipset Socket 370	\$198
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GA 5AA ALI Aladin V AGP Set AT Version	\$150
ASUS K7MA With Audio	\$329
ASUS K7V	\$329
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ABIT Bp6 Dual Celeron Socket 370 Support ATA66Mhz	\$260

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Pentium III 733EB P133 256K	\$780
Pentium III 750E	\$1,065
Pentium III 800E Intel CPU	\$1,295
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AMD K7 600 Mhz CPU	\$380
AMD K7 700 Mhz CPU	\$460
CPU Fan For AMD K7	\$29

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48 Speed Fujitsu IDE CD-ROM	\$82
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ACER 10 Speed DVD RAM	\$210
RICOH IDE 8 x 4 x 30 Speed	\$460
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HP 1000i IDE 8 x 4 x 32	\$435
IOMEGA ZIP External USB 4 x 4 x 6 \$555	

## MONITORS

### Monitor - ACER

15" Acer View 1554e 0.28dpi	\$262
17" Acer View 77c 0.27dpi	\$400
21" Acer View Monitor	\$1,675
15" Acer View LCD Monitor	\$1,815
17" Mitsubishi Diamond View 1772 0.26dpi	\$510
19" Mitsubishi Diamond View 1995 0.26dpi	\$1,020
17" Samsung SyncMaster 750S	\$419
19" Samsung 900SL	\$890
17" Sony E200	\$730
19" Sony G400	\$1,435
21" Sony G500	\$2,250

## MEMORY

### Memory

16MB 72Pin EDO RAM	\$88
64MB 168Pin SD RAM PC133 Kingmax	\$129
128MB 168Pin SD RAM PC133 Kingmax	\$248
256MB 168Pin SD RAM PC133	\$540
Memory for notebook (Toshiba, Acer, Compaq, T.I, Exc )	CALL

## NETWORK HARD DRIVE

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# Shop on the Web [www.corpsoft.com.au](http://www.corpsoft.com.au)

## NEW FOR WINDOWS 98 AND NT

### ● Dreamweaver Version 3



**\$475**

### ● Partition Magic Version 5



New Install **\$108**

### ● Paint Shop Pro Version 6



**\$163**

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NT Server V8 **\$949**  
NT Enterprise **\$1499**  
Win 95/98/NT **\$145**

## EVERY DAY LOWEST PRICES

ABC FlowCharter V7	\$320
Adobe Acrobat V4 - New Install	\$388
● <b>SPECIAL</b> Adobe Illustrator V8	\$625
Adobe InDesign <b>NEW V1.5</b>	\$1299
Adobe PageMaker 6.5 PLUS	\$810
ArcserveIT V6.61 W/Group Ed	\$699
AutoCAD LT 2000 <b>NEW!!!</b>	\$775
AutoCAD LT 2000 - Upgrade	\$279

**Adobe Photoshop LATEST V5.5**

New Install **\$995**  
Up from **\$349**

Borland C++ Build.ProV5 - New	\$695
Borland J Build.ProV3 - New	\$589
Borland Delphi Pro V5 - Upgrade	\$389
Borland Delphi Pro V5 - New Inst.	\$689
ClickNet Professional V5 10 User	\$695
CorelDRAW V9 - New Install	\$599
CorelDRAW V9 - Upgrade	\$385

MS Project 2000 - Upgrade	\$315
MS Project 98	\$745
MS Publisher 2000	\$142
MS Publisher 2000 - Upgrade	\$118

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MS Windows 98 New Install	\$329
MS Windows 98 Upgrade Rev.2	\$145
MS WinNT Client Licence	\$47
MS WinNT W/station V4 New Inst.	\$395

● <b>SPECIAL</b> - MS Word 97	\$289
● <b>SPECIAL</b> - MS Word 2000	\$299
● <b>SPECIAL</b> - MS VisualStudio Pro	\$1499
● <b>SPECIAL</b> - MS VisualStudio Ent	\$2299

### GST READY

MYOB Accounting V9 - <b>NEW !!!</b>	\$305
MYOB Plus V9 -including Payroll	\$450

Norton Utilities V2 for WinNT	\$65
Norton SystemWorks 2000 Pro V3	\$145
Norton Ghost - 10 user	\$345
Norton Ghost Personal Ed. V5.1	\$113
OmniPage Pro V10 Up/Cross	\$185
OmniPage Pro V10 - New Install	\$395
Paintshop Pro V6 - <b>New Version</b>	\$163
Partition Magic V5	\$108

**Beat the GST - Special Offer**  
Until June 30, 2000 all software is tax free and includes free installation support.

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Corel W/Perfect Office 2000 Upg	
\$225Crystal Reports Pro V8	\$580
Crystal Reports Pro V8 Upg	\$330
Diskeeper V5 for NT Workstation	\$99
Diskeeper V5 for NT Server	\$480
Dragon Nat. Speaking <b>Mobile V4</b>	\$449
Dragon Nat. Speaking Pref. V4	\$299
Drive Image Personal Edition	\$108
Easy CD Creator Deluxe V4	\$119
Exceed V6.2	\$899
InstallShield Express	\$440
Lotus Smartsuite Millen, Full	\$290
Lotus Smartsuite Millen. Upg	\$190

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Macromedia Fireworks 3 - <b>NEW</b>	\$319
Macromedia FLASH V4	\$515
Macromedia Freehand V9	\$625
Macromedia Web Design Studio	\$929
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MS FrontPage 2000	\$165
MS FrontPage 2000 - Upgrade	\$84
MS Money 2000 - <b>NEW !!!</b>	\$55
MS Project 2000	\$779

PhotoImpact V5	\$157
QuickBooks V7.x <b>GST Ready!!</b>	\$165
QuickBooks with Payroll V7.x	\$375
QuickBooks Pro V7.x	\$285
QuickBooks Pro with Payroll V7.x	\$459

Quicken Personal V7	\$60*
Quicken Deluxe V7	\$79*
Quicken For Business V7	\$130*

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Seagate B/up V8 - NT Server	\$949
Seagate B/up V8 - NT Serv. Upg	\$509
Seagate B/up V7.3 -NT Multi Serv.	\$1499
Seagate B/up V4.2 Win95/98/NT	\$145
Smartterm Essentials V9	\$295
SQL Anywhere Studio V6	\$630
Thumbs Plus	\$122

### GST Direct Assistance \$200 Rebate

We are a registered supplier for the GST Start-Up Program so you can redeem your \$200 voucher here

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VET Net Surfer AntiVirus	\$79
VISIO Tech 2000 - New Install	\$579
VISIO Std 2000 - New Install	\$299
Winfax Pro V9 + TalkWorks	\$115
WinZIP V7	\$58

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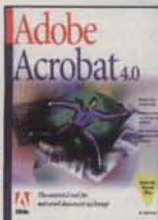
Full Version

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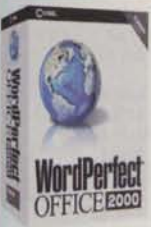
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New Install **\$388**



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(As at April 2000)

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- Office 2000 Prem. - New Install\* **\$665**
- Office 2000 Pro. - Upgrade **\$488**
- Office 2000 Pro. - New Install\* **\$608**
- Office 2000 Std. - Upgrade **\$375**
- Office 2000 Std. - New Install\* **\$495**
- Office 2000 SBE - Upgrade **\$365**
- Office 2000 SBE - New Install\* **\$485**

*Hurry limited stocks - Dealers not eligible*



\* Upgrade bundle with competitive product - limited stocks

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- Upgrade from Win95/98 **\$322**
- Upgrade from NT W/stat. **\$216**

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- New Install +5 Clients **\$1499**
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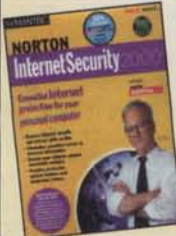
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300 watts ATX power supply MG-306 (made by MaCase)	\$75.00
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Aopen ATX case, HC45 Midi tower 250W power supply	\$106.00
Aopen ATX case, HC95 Desktop 250W power supply	\$120.00
Aopen ATX case, HQ45 Midi tower 250W power supply	\$129.00
Aopen ATX case, HT45 Midi tower 250 W power supply	\$120.00
Aopen ATX case, HX08 Full Tower 300 W power supply	\$240.00
Aopen ATX case, HX08 Full Tower 300 W power supply	\$203.00
Aopen ATX case, HX45A Midi tower 250W power supply	\$113.00
Aopen ATX case, HX48 Midi tower 300W power supply	\$150.00
Aopen ATX case, HX95 Desktop 250W power supply	\$125.00
Aopen ATX case, MT85 Micro ATX mini tower	\$97.00
Macase ATX case, C88 full tower 300w power supply	\$248.00
Macase ATX case, C88 full tower 400w power supply	\$275.00
Macase ATX case, K10 midi tower 300w power supply	\$145.00
Macase ATX case, K10 midi tower 400w Leadman PSU	\$169.00
Macase ATX case, K510 midi tower 300w power supply	\$147.00
Macase ATX case, K510 midi tower 400w Leadman PSU	\$169.00
Macase ATX case, K88 midi tower 300w power supply	\$145.00
Macase ATX case, K88 midi tower 400w Leadman PSU	\$169.00
Macase ATX case, KA-588 midi tower 300w power supply	\$147.00
Macase ATX case, KA-588 midi tower 400w Leadman PSU	\$169.00
Macase ATX case, KA-688 desktop 300w power supply	\$153.00
Macase ATX case, KA-M90 Micro ATX case	\$99.00
Macase ATX case, S80 full tower 300w power supply	\$240.00
Macase optional HDD mounting bracket for K10/K88	\$16.00
Macase optional HDD mounting bracket for K510/K588	\$16.00
YY ATX case, YY-0210X Cube case	\$339.00
YY ATX Rack mount case, YY-R420 case	\$555.00

### coolers

Case Fan 12v prewired	\$9.00
Cooler for hard drives, three 1cm fan	\$35.00
Cooler for hard drives, twin 1cm fan	\$25.00
Cooler for hard drives, twin 2cm fan	\$32.00
Cooler for hard drives, twin turbo cooler for 5.25"	\$45.00
Global Win 8cm case fan, ball bearing 3wires, w adapter	\$17.00
Global Win CBA012 3-pin to 4-pin adapter	\$2.00
Global Win CBA015 cooler connector splitter	\$2.00
Global Win CBF32 slot cooler, for AGP/PCI cards 2x fans	\$35.00
Global Win FA420 Chipset cooler	\$19.00
Global Win FD1260257B-2A, 6cm fan, two ball bearings	\$16.00
Global Win FEP32 CPU cooler, socket 7/Socket 370	\$35.00
Global Win FEP32 CPU cooler, mod FEP32 for BP6 M/B	\$39.00
Global Win FKK50 CPU cooler for Pentium II/K7 two fans	\$40.00
Global Win FKP32 CPU cooler socket 7/370/FC-PGA	\$39.00
Global Win GW101 CPU cooler thermal paste	\$3.00
Global Win I-Storm hard drives cooler	\$49.00
Global Win I-Storm II hard drives cooler	\$59.00
Global Win King Kong III hard drives cooler	\$25.00
Global Win LAC08 Chipset cooler	\$12.00
Global Win LEC08 Chipset cooler	\$16.00
Global Win PT08 CPU coolersocket 7/Socket 370	\$9.00
Global Win VFP32 CPU cooler, socket 7/Socket 370	\$26.00
Global Win VNS04 CPU cooler dual fan P III slot1 cooler	\$32.00
Global Win VOS32+ CPU cooler dual fan Pentium II/III/K7	\$75.00
Rear panel cooler, cools add-on cards	\$20.00
Rear panel cooler, cools add-on cards, new type	\$22.00

### motherboards

All prices include tax and are subject to change. Check the price on the web site. Full range of products on site.

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Abit Slot 1 M/B BF6, ATX	\$189.00
AOpen Slot 1 M/B AX64Pro supports PC133 AGP 4x	\$219.00
AOpen Slot 1 M/B AX68C BX chipset, ATX, type R	\$182.00
AOpen Slot 1 M/B AX68C Pro BX chipset, ATX	\$199.00
AOpen Slot 1 M/B AX68C Pro Gold	\$305.00
AOpen Slot 1 M/B AX68C Pro II BX chipset Millennium ed	\$310.00
AOpen Slot 1 M/B AX6C-L 820 chipset 2x RIMM slots	\$296.00
AOpen Slot A M/B AK72 K7 Athlon 4x AGP KX133 chipset	\$285.00
AOpen Socket 370 M/B MX3WPro-E, VGA/Sound, FC-PGA	\$240.00
AOpen Socket 370 M/B MX3WPro-V, VGA/Sound, FC-PGA	\$186.00
AOpen Super 7 M/B MX59PRO ATX, UDMA/66, VGA/Sound	\$179.00
Asus DIMM Riser 2, to use SDRAM in RDRAM slot	\$70.00
Asus motherboard heatsink thermistor P2T-Cable, 2 pin	\$12.00
Asus motherboard IrDA Infrared module	\$40.00
Asus Slot 1 M/B P2B-D Dual Pentium II motherboard	\$565.00
Asus Slot 1 M/B P2B-DS Dual CPU with on board Ultra 2 SCSI	\$920.00
Asus Slot 1 M/B P2B-LS on board U2 SCSI and 100Mbps Lan	\$756.00
Asus Slot 1 M/B P2B-S with Ultra 2 SCSI on board	\$623.00
Asus Slot 1 M/B P3B-1394 on board firewire 1394 interface	\$399.00
Asus Slot 1 M/B P3B-F Jumperfree 4x DIMM	\$265.00
Asus Slot 1 M/B P3C-E 2x RDRAM slots	\$390.00
Asus Slot 1 M/B P3C2000 4x SDRAM slots	\$335.00
Asus Slot 1 M/B P3V4X 133MHz, AGP 4x, UDMA/66	\$219.00
Asus Slot 1 M/B K7V AMD Athlon K7 motherboard	\$342.00
Asus socket FC-PGA M/B CUV4x-M 133MHz, AGP 4x, UDMA/66	\$235.00
Asus Super 7 M/B P5A, ATX	\$177.00
Asus Super 7 M/B P5A-B, Baby AT	\$175.00
Asus Super 7 M/B P5S-B, Baby AT with on board AGP video	\$159.00
Asus USB/MIR, provides USB, IR, PS/2 mouse connections	\$15.00
Epox Slot A M/B EP-7KXA AGP x4 PC133	\$269.00
Epox Super 7 M/B EP-MVP3G-2 ATX UDMA/66	\$185.00
Micro-star Slot A M/B K7Pro (MS-6195) for K7 Athlon	\$270.00
PC Chips ATX form card, adapter for PS/2, USB, IR	\$7.00
PC Chips Slot 1/Socket M/B M741LMRT, 5 in 1, Micro ATX	\$175.00
Soyo Slot 1 M/B SY-6BA+IV BX chipset, ATX	\$229.00

### multimedia

CDROM drive Afreey CD-2050E 50x	\$85.00
CDROM drive Aopen, IDE 40x CD-940Pro	\$81.00
CDROM drive Aopen, IDE 48x CD-948Pro	\$83.00
CDROM drive Aopen, IDE 52x CD-952E\$105.00	
CDROM drive Asus, IDE 50x	\$110.00
CDROM drive Teac, SCSI 32x CD-532x 512KB buffer	\$179.00
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DVD decoding card REALmagic DVDMagic Pro Hollywood+	\$189.00
DVD remote control for REALmagic DVDMagic Pro decode card	\$45.00
DVD ROM drive Afreey DD-4010E 10x	\$245.00
DVD ROM drive Asus DVD-E608 8x/40x	\$259.00
DVD/CDRW kit Ricoh MP9060A, 24x6x4x+4x	\$595.00
Sound card Aopen, AW200 PCI	\$38.00
Sound card Aopen, AW37 ISA	\$32.00
Sound card Asound, PCI 3D surround wave table	\$25.00
Sound card Creative, Vibra 128, 128-voice wave-table	\$55.00
Sound card Creative, Sound Blaster Live! Optical (Platinum)	\$455.00
Sound card Creative, Sound Blaster Live! Value Digital OEM	\$114.00
Sound card Diamond, MX400 Monster sound OEM	\$129.00
Sound card Xitel Storm, Platinum Game Pack	\$186.00
Sound card Xitel Storm, Platinum OEM\$122.00	
Speakers 120Watt	\$25.00
Speakers 480watt	\$40.00
Speakers Creative FPS1000 Cambridge SoundWorks	\$199.00
Speakers T-Rex 2000, 1400w	\$199.00

### recordable

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CDR drive Teac 6x write 24x read bare drive only	\$475.00
CDR kit bundle, Panasonic 8x20x drive, DC315 SCSI, software	\$499.00
CDRW kit Acer Cd-Writer 4432 CDRW kit, 32x4x4x	\$349.00
CDRW kit Acer Cd-Writer 6432 CDRW kit, 32x4x4x	\$439.00
CDRW kit HP Cd-Writer Plus 9100i IDE CDRW kit, 32x4x4x	\$489.00
CDRW kit Ricoh MP7080A IDE CDRW kit, 32x4x4x	\$479.00
CDRW kit Ricoh MP9060A IDE CDRW kit+DVD, 24x6x4x+4x	\$595.00
DVD-RAM kit Aopen DVD-520S	\$1123.00
Media CDR Ricoh, 50 CDR bulk pack on a spindle	\$90.00
Media CDR Seantam CDR 80min	\$2.40
Media CDR TDK blue CDR Multispeed	\$2.40
Media CDR Verbatim blue CDR	\$2.40
Media CDRW Acer media	\$12.00

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Floppy drive, 1.44 MB Panasonic	\$29.00
Floppy drive, 1.44 MB Teac FD-23HF	\$32.00
IDE HDD IBM 20GB DPTA-372050 7200 RPM, 2MB cache	\$379.00
IDE HDD Seagate 8.4GB ST38410A, UATA/66	\$209.00
IDE HDD Seagate 17GB ST317221A, UATA/66	\$279.00
LS120 120MB floppy drive	\$155.00
LS120 disk 120MB	\$18.00
Mounting kit, mount 3.5" hard drive in 5.25" bay	\$5.00
Mounting kit, mount floppy/zip drive in 5.25" bay	\$5.00
Tape drive, Sony SDT-7000R DAT drive internal SCSI	\$1220.00
Tape drive, Sony SDT-9000R internal DDS3 drive SCSI	\$1655.00
Tape for DAT drive, DDS-2\$25.00	
Tape for DAT drive, DDS-3\$40.00	
Zip drive cartridge	\$23.00
Zip drive cartridge 250MB	\$35.00
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### video cards

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3DFx Voodoo3 2000 PCI OEM, 16MB, 2D/3D	\$239.00
3DFx Voodoo3 3000 AGP OEM, 16MB, 2D/3D	\$316.00
3DFx Voodoo3 3000 PCI OEM, 16MB, 2D/3D	\$339.00
Aopen PA3000 Nvidia Vanta 16MB 128 bit	\$139.00
Aopen PA3000 Nvidia Vanta 8MB 128 bit	\$109.00
Aopen PA3020Pro Riva TNT2 32MB Open BIOS with TV out	\$328.00
Aopen PA45 4MB RAM SIS6326 chipset	\$65.00
Aopen PA50E 8MB RAM with TV out	\$85.00
Asus AGP-V3800TNT2 ultra Deluxe with video in	\$399.00
Asus AGP-V6600 GeForce 256, 32MB SGRAM	\$499.00
Asus AGP-V6600Deluxe GeForce 256, 32MB SGRAM	\$585.00
Asus AGP-V6800 Deluxe GeForce 256 DDR, 32MB	\$656.00
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Asus TV Box, external TV tuner for Asus video cards, remote	\$139.00
Chaintek AGP-R170 GeForce256 32MB SDRAM	\$390.00
Leadtek WinFast GeForce256 32MB AGP card	\$462.00
Leadtek WinFast GeForce256 DDR 32MB AGP card	\$545.00
Leadtek WinFast GeForce256 DDR 64MB AGP card	\$785.00
Matrox G-Series Rainbow Runner Studio	\$375.00
Matrox Marvel G400-TV 16MB SGRAM AGP Video Capture/Editing	\$689.00
Matrox Millennium G200 8MB SDRAM AGP OEM	\$139.00
Matrox Millennium G200 8MB SDRAM PCI OEM	\$222.00
Matrox Millennium G400 16MB AGP OEM	\$245.00
Matrox Millennium G400 32MB dual head AGP OEM	\$365.00
Matrox Millennium G400 Max 32MB dual head AGP retail	\$465.00
MSI MS-8808 TNT2 M64 32MB video card	\$183.00

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 CANON BJC-600/610/620  
 CANON BJC-2000/4000/4100/4200/4300/4550/5000/5500 BCI-21  
 CANON BJC-2000/4000/4100/4200/4300/4550/5000/5500 BC-20  
 CANON BJC-3000/6000  
 HP Desk Jet 400/500 Series  
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 HP Deskjet 300 Series & Olivetti JP's!  
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 EPSON Stylus 820/colour II/III  
 EPSON Stylus Colour 200/300/400/500/600/800/850/1520  
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7  
16  
45  
9  
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6  
8  
8  
8  
12  
12  
12  
6  
6  
12

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46-BKL  
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8B-BKL  
29-BKL  
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 CANON BJC-2000/4000/4100/4200/4300/4550/5000/5500 BCI-21  
 CANON BJC-3000/6000  
 HP Colour Desk Jet 300/400/500 Series & Olivetti!  
 HP Colour Desk Jet 600C/660C/690C Series  
 HP Desk Jet 850C/855C/870C/1000C Series  
 HP Desk Jet 710/720/890 Series  
 EPSON Stylus Colour /PRO/XL  
 EPSON Stylus 820/colour II/III  
 EPSON Stylus Colour 200/300/400/500/600/800/850/1520  
 EPSON Stylus Colour 440/460/640/660/700/740/760/900  
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3x4  
3x12  
3x12  
3x12  
3x6  
12/Colour

#### Kit Code

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25-CLR  
10-CLR  
17-CLR  
47-CLR  
14A-CLR  
14B-CLR  
30A-CLR  
30B-CLR  
16-CLR  
24-CLR  
34A-CLR  
34B-CLR  
36A-CLR  
36B-CLR  
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PENTIUM EPOX APOLLO AT MVP3CII U66 151  
PENTIUM EPOX APOLLO AT MVP3GII U66 166  
PENTIUM III MOTHERBOARD AT-ATX  
PENT. III MB PC100 XCEL2000 AT 748LMR 156  
PENT. III A-PLUS AP-921 MB AT 100MHz 113  
GIGABYTE GA-6A7+ VIA APOLLO S370 AT 156  
PENTIUM III MB FC-PGA DFI CM95 SERIES 175  
ATHLON MB GIGABYTE GA7X ATX 133MHz 299  
ATHLON MB FC 1ST MB SD11 ATX SLOT A 231  
PENTIUM III MB GIGABYTE BX2000+ D/B ATX 258  
PENTIUM III MB ASUS P3V4X/533-U 133MHz 195  
PENTIUM III MB ASUS P3C2000 ATX 133MHz 318

## CPU'S - SOCKET 7 - PENTIUM III

CYRIX/IBM 686M2-300/333 CPU M2 - MMX CPU 64  
AMD K5 II P-450 3D CPU WITH MMX TECH. 116  
AMD K5 II P-500 3D CPU WITH MMX TECH. 126  
AMD K5 II P-600 3D CPU WITH MMX TECH. 253  
AMD ATHLON K7-3 P-600 3D CPU NEW SLOT A 435  
AMD ATHLON K7-3 P-700 3D CPU NEW SLOT A 591  
AMD ATHLON K7-3 P-750 3D CPU NEW SLOT A 798  
AMD ATHLON K7-3 P-800 3D CPU NEW SLOT A 1,155  
CELERON 466A Mhz 3-370 CPU INTEL IN BOX 214  
CELERON 500A Mhz 3-370 CPU INTEL IN BOX 292  
CELERON 533A Mhz 3-370 CPU INTEL IN BOX 34  
COFFERLINE-CELERON PPGA CONVERTOR 431  
INTEL PIII 550E IN BOX 256K ATX, FC-PGA 457  
INTEL PIII 550E IN BOX 256K ATX, FC-PGA 470  
INTEL PIII 550E IN BOX 512K SECC2 ORIGINAL 515  
INTEL PIII 600E/133MHz BOX FC-PGA 537  
INTEL PIII 650/100MHz BOX 256K ATX SECC2 704  
INTEL PIII 667/133MHz BOX 256K ATX SECC2 744  
INTEL PIII 700/100MHz BOX 256K ATX SECC2 869  
INTEL PIII 733/133MHz BOX 256K ATX SECC2 996  
INTEL PIII 750/100MHz BOX 256K ATX FC-PGA 1,151  
INTEL PIII 800/133MHz BOX 256K ATX FC-PGA 1,731

## HARD DISK DRIVES 4.3 GIG - 20.4 GIG

4.3 GIG S-GATE/FLUITS/SAMSUNG HD 5400 RPM 169  
6.8 GIG SAMSUNG HARD DISK 5400 RPM 192  
6.4 GIG FUJITSU ULTRA 66 HD 5400 RPM 189  
6.4 GIG WESTERN DIGITAL, HD 5400 RPM 201  
8.4 GIG SAMSUNG ULTRA 66 HD 5400 RPM 202  
8.4 GIG W/DIGITAL ULTRA 66 HD 5400 RPM 208  
10.2 GIG SAMSUNG HD ULTRA 66 5400 217  
10.2 GIG WESTERN DIGITAL ULTRA 66 5400 228  
13.6 GIG SAMSUNG HD ULTRA 66 5400 236  
13.6 GIG IBM HARD DISK DRIVE 7200 RPM 278  
13.6 GIG WESTERN DIGITAL ULTRA 66 7200 RPM 241  
13.6 GIG SEAGATE ULTRA 66 5400 RPM 257  
15.3 GIG SAMSUNG HD ULTRA 66 5400 292  
20.5 GIG WESTERN DIGITAL ULTRA 66 5400 RPM 361  
20.5 GIG IBM HARD DISK DRIVE 7200 RPM 356  
27.3 GIG WESTERN DIGITAL ULTRA 66 5400 RPM 461  
27.3 GIG WESTERN DIGITAL ULTRA 66 7200 RPM 491  
30.7 GIG WESTERN DIGITAL ULTRA 66 5400 RPM 440

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8MB AGP VIDEO CARD TRIDENT/ S3 65  
8MB AGP VIDEO CARD TRIDENT/ S3 65  
8MB TRIDENT 6880 PCI VIDEO CARD 91  
8MB S3 SAVAGE 4 PCI VIDEO CARD 99  
8MB EDO S3 AGP VIDEO CARD W-TV OUT 78  
VIDEO/CAPTURE CARDS-DIAMOND-MATROX  
32MB S3 SAVAGE 4 PCI VIDEO CARD 105  
16MB RIVA TNT-2 VANTA 3D AGP VIDEO CARD 170  
32MB RIVA TNT-2 VANTA 3D AGP VIDEO CARD 156  
D/S 3D S3 SAVAGE4 PRO+ S540 OEM AGP 16MB 111  
D/S 3D S3 SAVAGE4 PRO+ S540 NSW AGP 32MB 234  
DIAMOND VIPER II 2200 32 MB RETAIL 350MHz 363  
30FX VOD0003 2000 PCI/AGP 16MB 143MHz OEM 517  
30FX VOD0003 3000 AGP 16MB TV OUT OEM 311  
30FX VOD0003 3500 AGP 16MB TV OUT 667  
MATRIX MARVEL G-400 15MB 16MB VIB CAP/EDIT 661  
MATRIX MYSTIQUE/MILL 6200 8MB AGP OEM 127  
MATRIX MILLENIUM G400 DUAL 16MB 300MHz OEM 264  
MATRIX MILLENIUM G400 DUAL 32MB 300MHz OEM 358  
MATRIX MILLENIUM G400 DUAL 32MB 300MHz R 423  
MATRIX MILLENIUM G400 MAX DUAL 32MB 360MHz 450  
G-SERIES G2000/G400 RAINBOW RUNNER CAPTURE 342

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SPECTRA 3000 TNT GeForce AGP 32MB TV OUT 467  
PROPHET GeForce AGP 32MB & TV OUT RETAIL 488  
CREATIVE GeForce 32MB AGP 350MHz RAMDAC 545  
CREATIVE GeForce 32MB AGP 350MHz PRO 501  
ASUS V-3800 DELUXE AGP 32MB 3D GLASSES 374  
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72 PIN 16 MEG SIMM STD 60NS 66  
72 PIN 32 MEG SIMM STD 60NS 130  
72 PIN 16 MEG EDO SIMM 50NS 62  
72 PIN 32 MEG EDO SIMM 50NS 124  
168 PIN SDRAM DIMM MODULE 32MB PC100 63  
168 PIN SDRAM DIMM MODULE 64MB PC100 116  
168 PIN SDRAM DIMM MODULE 64MB 133MHz 102  
168 PIN SDRAM DIMM MODULE 128MB PC100 209  
168 PIN SDRAM DIMM MODULE 128MB 133MHz 218  
168 PIN SDRAM DIMM MODULE 256MB PC100 510  
KODAK DC CAMERA FLASH RAM 20MB 132  
KODAK DC CAMERA FLASH RAM 32MB 156

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MICROSOFT K/B INTERNET WIN98- OEM 59  
MOUSE STD MS COMPATIBLE S, OR PS/2 11  
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MS MOUSE INTELLI EXPLORER PS/2 & USB 113  
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## PRINTERS HP - EPSON - CANON

HP 610 COLOR INK JET PRINTER A4 197  
HP 810 COLOR INK JET PRINTER A4 288  
HP 880C COLOR INK JET PRINTER A4 370  
HP 930C COLOR INK JET PRINTER A4 397  
HP 950C COLOR INK JET PRINTER A4 531  
HP 970 CXL COLOR INK JET PRINTER 740  
HP 1120 C COLOR INK JET PRINTER A3 740  
HP1100 LASER PRINTER 6000PI 8PPM A4 787  
HP 1100A LASER PRINTER/SCAN 8PPM A4 922  
HP2100 LASER PRINTER 12000PI 10PPM A4 1,364  
HP OFFICE JET T45C SCAN/COPY/PRINT/FAX 821  
HP OFFICE JET T65C SCAN/COPY/PRINT/FAX 899  
HP OFFICE JET T45C SCAN/COPY/PRINT 1,080  
HP OFFICE JET T65C SCAN/COPY/PRINT 1,196  
EPSON STYLUS COLOR 600 1440x720 290  
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EPSON STYLUS COLOR 760 1440x720 393  
EPSON COLOR PHOTO 700 1440x720 543  
EPSON STYLUS COLOR 860 1440x720 721  
EPSON STYLUS COLOR 1160 A3 1440x720 796  
EPSON STYLUS PHOTO 1270 A3+ 880  
CANON BJC 50 A4 COLOR PORTABLE 578

CANON BJC 80 A4 COLOR PORTABLE 328  
CANON 50 & 80 SCANNER HEAD OPTION 133  
CANON BJC 2655P A4 COLOR 720DPI 126  
CANON BJC 2000 A4 COLOR 720DPI 156  
CANON BJC 3000 A4 COLOR PHOTO 257  
CANON BJC 4650 A3 COLOR PHOTO 417  
CANON BJC 5100 A4 COLOR 1440DPI 330  
CANON BJC 5500 A2 COLOR 1440DPI 1,249  
CANON BJC 6000 A4 COLOR 1440DPI 337  
CANON BJC 7100 A4 COLOR 1200DPI 499

## SCANNERS STD - HP - CANON

BASIC FLATBED SCANNER PARALLEL 127  
HP 3200C SCANNER 6000DPI PARALLEL 182  
HP 3300C SCANNER 6000DPI USB 228  
HP 4200C SCANNER 600/9600DPI USB 274  
HP 5200C SCANNER 600/9600DPI USB+P 363  
HP 5300C SCANNER 1200/9600DPI USB 531  
HP 6300C SCANNER 1200DPI USB 723  
HP 6300C SCANNER 1200DPI USB +ADF 904  
CANON FB330P SCANNER 300/600DPI 131  
CANON FB630P SCANNER 600/1200DPI 176

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AT MIDDLE TOWER CASE LED LCD W/P/S 75  
ATX DESKTOP CASE DELUXE W/P/S 152  
ATX MIDDLE TOWER CASE W/P/S 80  
ATX MIDDLE A-OPEN HX45 CASE DELUXE 107  
ATX GALAXY MIDDLE/DESK TOP DELUXE 135  
ATX FULL A-OPEN HX08 CASE DELUXE 218  
EXTRA FAN COOLING FOR CASE FRONT 19

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IOMEGA ZIP DRV INT. IDE 100MB OEM 19  
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IOMEGA ZIP DRIVE EXT. 100MB USB 237  
IOMEGA 100MB ZIP DISKS EACH PC 187  
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HP Lxjet 2100	32mb	SIMMS 72 PIN
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IBM - PC 365, 518L, S200	64mb	32Mb EDO 60ns \$145
IBM - Thinkpad 365X, X0	32mb	64Mb EDO 60ns \$340
NEC - Versa E, 4000	32mb	128Mb EDO 60ns \$695
NEC - Versa LX, SX	64mb	16Mb Fast Page Mode 60ns \$84
Toshiba - 3800, PIII	128mb	32Mb Fast Page Mode 60ns \$182
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HP Deskjet 820, 850, 855, 870, 1200, 1600  
HP Deskjet, Deskwriter, Portable, Designjet, 300, 320  
HP PHOTOSMART Star & Moon combined  
Canon BJ-30, BJC-70, BJC-80  
Canon BC-01, BC-02, BJC-210  
Canon BC-03, BC-3X (fax) BJC-210sp, 245, 255, 265  
Canon BC-06 photo  
Canon BJ-300, 330  
Canon BJC-600, 610, 620  
Canon BJC-800, 820, 880  
Canon BJC-2000 BC-20, BCI-21, BCI-21C  
Canon BJC-4000, 4100, 4200, 4300, 4550, 5000, 5500 BCI-21  
Canon BJC-4000, 4100, 4200, 4300, 4550, 5000, 5500 BC-20  
Canon BJC-5000/5500 (BC-23 only)  
Canon BJC-3000 / BJC-6000 (BC-30 & BC-31)  
Canon BJC-6000 (BC-32 PHOTO)  
Canon BJC 7000, 7100 BC-60, BC-61  
Canon BJC 7000, 7100 photo BC-62  
Epson Stylus Color 800 / 1520  
Epson Stylus Color 200 / 820 Color 11 / 11s  
Epson Stylus 400 / 800 / 800+ / 1000  
Epson Stylus Color Pro / XL  
Epson Stylus Color 400 / 600  
Epson Stylus Color 500 Not the same inks as the 400 / 600  
Epson Stylus Photo / Photo EX / photo 700, 1200photo kit  
Epson Stylus Color 3000 / 5000  
Epson Stylus Color 440 / 640 \*Not the same ink as 400/600  
Epson Stylus Color 740 (900 & 1200 available)  
Epson Stylus Color 750 & 1200  
Epson Stylus Color 300 (four colour cartridge)  
Lexmark/IBM 4076/1020/2030/2050/2070/1000  
Lexmark/IBM 2030 / 2050 waterproof  
Lexmark/IBM 2030 / 2050 photo  
Lexmark/IBM 5000, 5700, 7000 (photo available)  
Olivetti JP150/170/192/250/350/360/450/3100  
Brother and Apple available  
MANY OTHER KITS AVAILABLE, NOT LISTED  
**CARTRIDGE CLEANING KITS**

Black kit code	No refills	Colour Kits Code	No refills
K1BK	6/9	K9CLR	12
K2BK	6/9	K10CLR	12
K3BK	6	K22CLR	6
K3BK	6	K11CLR	6
K1BK	6/9	K9CLR	12
		K25CLR	6
K7BK	60	K1CLR	30
K8BK	7	K2CLR	12
K4BK	9	K2CLR	12
		K23CLR	6
K9BK	7		
K10BK	16	K3CLR	8
K11BK	12	K4CLR	4
K12BK	9/60	K5CLR	30
K12BK	60	K5CLR	30
K12BK	9	K5CLR	30
K27BK	9	K5CLR	30
K28BK	12	K35CLR	6
		K36CLR	6
K19BK	2	K24CLR	6
		K15CLR	6
K13BK	12	K20CLR	6/12
K16BK	12	K7CLR	6/12
K14BK	12	K6CLR	12
K15BK	8	K6CLR	6
K17BK	12	K20CLR	6/12
K17BK	12	K8CLR	6
K17BK	12	K17CLR	6/12
K21BK	3	K34CLR	3
K28BK	12	K16CLR	6/12
K6BK	12	K16CLR	6/12
K6BK	12	K35CLR	6
		K33CLR	9/12
K18BK	6	K13CLR	12
K24BK	6	K13CLR	12
		K29CLR	12
K25BK	6	K30CLR	12
K26BK	8	K19CLR	12

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31120-8	Photo Glossy Paper 160 GSM - Makes any ink water resistant	A4	20	\$24.90
25115-2	Photo Glossy Greeting Cards with envelopes Water Resistant	A4	15	\$17.90
14120-1	Artist Watercolor Paper 200GSM EMBOSSED PATTERN	A4	20	\$19.90
24120-8	Photo Glossy White Film (100 LM)	A4	20	\$22.90
25115-3	Transparency Film (100 LM)	A4	15	\$19.90
12108-1	Silver Reflective Film (150 LM)	A4	8	\$19.90
11108-2	Artist Canvas (200GSM)	A4	8	\$19.90
13208-7	Poly-Silk Adhesive (100GSM) ADHESIVE BACKED FABRIC	A4	8	\$19.90
32110-8	Clear Window Decal - Sticks to glass	A4	10	\$19.90
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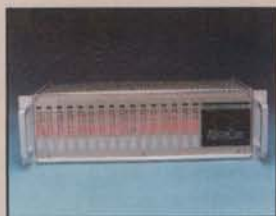
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HDD	5GB	10GB	10GB	10GB	15GB
CD/DVD	CD/LAN	CD/LAN	CD/LAN	CD/LAN	CD/LAN
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RAM	64MB	96MB	128MB
HDD	10GB	15GB	20GB
CD/DVD	40x CD-ROM	40x CD-ROM	CD R/Writer
V.90 Modem	Yes	Yes	Yes
Monitor	Aspire 17"	Aspire 17"	Aspire 17"
OS	Win98 2nd Edition	Win98 2nd Edition	Win98 2nd Edition
Part number	(99775)	(99776)	(99777)
RentSmart*	\$21.69/ Week	\$21.23/ Week	\$25.38/Week
Price	<b>\$1,999</b>	<b>\$2,499</b>	<b>\$2,999</b>

\* Not included with Aspire 6400  
\*\* Included only with Aspire 6400

JUN  
**4**



# COMPAQ

See this Web Direct Link to see "live" pricing or to order.

Web  
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[www.ht.com.au/cat/compaq](http://www.ht.com.au/cat/compaq)

## COMPAQ + Quicken = GST Ready

Check for latest  
prices & products!

Is your business  
ready for  
**GST?**  
Check page 7

# Deskpro

Compaqs Deskpro range of desktop PCs give you the **power to perform**, providing a professional solution for networked and enterprise environments. Offering flexible design, outstanding long-life performance and serviceability, Compaq Deskpro PCs are the manageable enterprise PCs you can count on.



DeskPro EN



DeskPro  
EP

\*\* RentSmart  
rates are  
higher when  
Equipment  
value is less  
than \$2,000

	EN	EN	EN SFF	EP
Processor	PIII733MHz	PIII600EBMHz	PIII600EBMHz	PIII600EBMHz
RAM St/Max	128MB/1GB	128MB/1.6GB	64MB/512MB	64MB/512MB
Hard Disk	13.5GB	13.5GB	13.5GB	10.0GB
Graphics	16MB	16MB	16MB	8MB
CD-ROM	40x max	40x max	40x max	40x max
Win 95/98				
Part #	(91423)*	(91411)*	(95924)	(95928)*
Rent 3 Yrs**	<b>\$33.69</b>	<b>\$27.00</b>	<b>\$21.92</b>	<b>\$18.46</b>
Inc Tax	<b>\$3,983</b>	<b>\$3,179</b>	<b>\$2,594</b>	<b>\$2,160</b>
Win NT 4.0				
Part #	(91424)*	(91412)*	(95923)*	(97909)*
Rent 3 Yrs**	<b>\$34.61</b>	<b>\$27.69</b>	<b>\$22.15</b>	<b>\$19.84</b>
Inc Tax	<b>\$4,090</b>	<b>\$3,269</b>	<b>\$2,599</b>	<b>\$2,334</b>

\*NO MONITOR

### Compaq Monitors

15" MV520

Monitor

**\$410**

(86202)

17" MV720

Monitor

**\$615**

(86205)



### QuickBooks PRO

**\$199**

When  
purchased  
with a  
Compaq  
system,  
QuickBooks  
invoices,  
tracks unpaid  
bills,  
calculates  
charges on  
overdue  
payments,  
shows users  
what they  
owe, and  
more. See  
Web Direct  
for more info

# Presario

Plug into the new range of Presario PCs to experience cutting-edge multi-media, quick Internet access and high-powered features that will simply blow you away. Offering breakthrough value, these PCs are power-packed to meet the individual needs of a growing family.

	Home & Home Office	High End PC	Portable
Processor	533MHz AMD	PIII667MHz	PIII500MHz
RAM St/Max	64MB/320MB	128MB/640MB	64MB/192MB
Hard Disk	8GB	20GB	12GB
Graphics	8MB	16MB	8MB
Modem	56K/V.90	56K/V.90	56K/V.90
Drives	40x CD-ROM	8x DVD-ROM/CD-RW	6x DVD-ROM
Op System	Win 98	Win 98	Win 98
Monitor	15"	NO	14.1 TFT
Part#/Rent**	(99165) <b>\$20.30</b>	(96742) <b>\$28.61</b>	(94500) <b>\$41.76</b>
Inc Tax	<b>\$1,872</b>	<b>\$3,385</b>	<b>\$4,920</b>

\*\* RentSmart rates are higher when Equipment value is less than \$2,000



\*RentSmart  
The figures  
shown are  
based on a per  
week basis over  
3 years. To  
approved  
persons, Terms  
and Conditions  
apply. GST May  
apply to  
commitments  
made now!  
Refer to Page 2  
for more  
details.

JUN

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# HP with FREE GST-Ready Quicken

## HP Brio special GST Bundles



GST  
Direct  
Assistance  
You may  
be  
eligible  
for a  
\$200  
Rebate.

	BA400/15	BA400/17	BA600/15	BA600/17
CPU	Celeron®	Celeron®	Pentium® III	Pentium® III
Speed	533MHz	533MHz	550MHz	550MHz
RAM	64MB	64MB	64MB	64MB
HDD	10GB	10GB	10GB	10GB
LAN	10/100	10/100	10/100	10/100
Monitor	15"	17"	15"	17"
CD-ROM	48x	48x	48x	48x
Part	(95561)	(95562)	(95563)	(95564)
Price	<b>\$2,129</b>	<b>\$2,289</b>	<b>\$2,479</b>	<b>\$2,659</b>
Rent/Wk	<b>18.00</b>	<b>19.38</b>	<b>21.00</b>	<b>22.61</b>

Each system also includes 4 watt HP Speakers



Each of these special Brio/Omnibook Bundles includes QuickBooks PRO Version 7 OEM AND Quick Payroll PRO Version 6 OEM to help your business more easily comply with the GST requirements. QuickBooks PRO V7 is GST-Ready.

**GREAT  
BUNDLE**  
**GREAT  
VALUE**

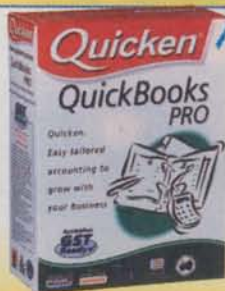


	XE2 C-450	XE2-PIII 500
CPU	Celeron®	Pentium III®
Speed	450MHz	500MHz
Screen	12.1"TFT	14"TFT
RAM	64MB	64MB
HDD	4GB	6GB
Modem	56K Modem	56K Modem
CD/DVD	24X CD-ROM	6X DVD-ROM
Op Sys	Win 95/98	Win 98
Part	(95567)	(95569)
Price	<b>\$3,529</b>	<b>\$4,995</b>
Rent / Week	<b>30.00</b>	<b>42.23</b>

Each includes QuickBooks PRO V 7

## HP OmniBook XE2

**Great Value!**



## GST-Ready Software

For small to medium sized businesses. QuickBooks is the world's best selling financial management and accounting system. QuickBooks PRO is multi-user capable, features advanced job costing & budgeting, time tracking & billing, integrated estimating & quoting. Can be used for either cash or accrual accounting. QuickBooks PRO 7 is GST-ready.

JUN  
**6**

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TECHNOLOGY™**

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Australia Wide

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Direct

For LIVE pricing or to order see...

[www.ht.com.au/cat/quicken](http://www.ht.com.au/cat/quicken)

# Is your business ready for the GST?

## QuickBooks



Designed for small to medium businesses. Handles inventory and double entry Accounting. Keeps track of bank balances, loans and other finances. Calculates charges on overdue payments, monitors unpaid bills, writes and prints cheques, records stock and offers 79 different financial graphs and reports. QuickBooks is GST Guaranteed.

- Manages small business finance
- Invoicing and debt management for small business
- Insights into finance
- Accounts receivable / debtors tracking
- Accounts payable / creditors tracking
- Inventory and purchase order control
- Customisable invoices and statements
- Cheque preparation and printing

**NEW  
VERSION**

(94375)

**\$175**

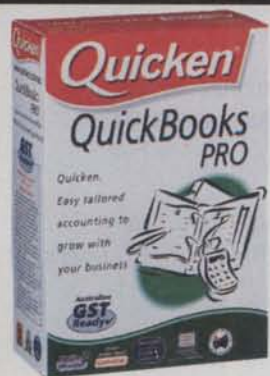
Web  
Direct

Be sure to check all of the Quicken options available from the Web-Direct link.

We also stock Quicken's range of Personal Financial Software. Suitable for individual users.

Cross grades and upgrades are available.

## QuickBooks PRO



With all the features of QuickBooks, QuickBooks PRO allows you to allocate staff time and material costs to a job or project. The additional time management tools, cost estimating and employee hours can flow directly on to invoices. Get an instant snapshot of your business with up to 90 financial reports and graphs.

- Advanced job costing and budgeting
- Cheque and credit card account reconciliation
- Flexible and customisable reporting
- 90 Reports and graphs
- Cheque preparation and printing
- Sales tax calculation
- Estimates for better quoting
- Time tracking/on-screen timer

**NEW  
VERSION**

(94377)

**\$299**

## QuickPayroll PRO

Take the stress out of managing your payroll. Produces your group certificates, looks after tax file numbers, bank details, deductions, holidays, sick leave and terminations.

Print payslips, customise your reports, look after Fringe Benefit Taxes

(FBT) and remit FBT payments and group certificate data directly to the ATO.

Handles up to 999,999 employees.

Gives insights into finances and calculates variable rates of pay.

Quick Payroll PRO has recently been awarded Australian PC User Best Buy. Integrates with QuickBooks or QuickBooks PRO to simplify managing your business.



(77589) **\$285**

## QuickPOS with QuickBooks PRO

### The Ultimate Cash Register!

With the upcoming GST, retailers both small and large will require systems that can adequately handle the intricacies of the tax. Quicken's QuickPOS point of sale software has the same operation and features of a powerful electronic

cash register and at the press of a button transfers all sales into QuickBooks PRO for full back office accounting and management. By using QuickPOS, retailers are assured of being able to cope with the introduction of the GST. Software features such as integrated EFTPOS, lay-by and support for scales mean QuickPOS is suitable for all retail environments - from high volume to specialty. Includes free upgrade to v3 giving you even more:

**FREE  
UPGRADE  
TO V3**

(84232)

**\$874**

\*When you register the program

- Label printing
- Additional hardware support
- GST/Sales Tax management
- Customer loyalty

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7

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See Page 2 for Locations



# MYOB

Web  
Direct

[www.ht.com.au/cat/myob](http://www.ht.com.au/cat/myob)



## Simply makes the GST less taxing

GST is now only weeks away. MYOB accounting products handle both the current Wholesale Sales Tax (WST) and the approaching GST with ease - allowing you to prepare now and smoothly make the transition from WST to GST on July 1st. The extensive GST features enable you to effortlessly collect, pay and report GST.

### Why choose MYOB?

- **Australia's simple to use, number one accounting software**

Over 180,000 Australian businesses have selected MYOB as the simple solution to managing their growing accounting needs.

- **GST-Ready**

GST arrives on July 1, don't allow your business to be left behind. MYOB software takes the stress out of preparing for, and handling, the GST. With the help of MYOB, you can manage this GST.

- **Made in Australia for the Australian GST**

Australia's GST and business requirements are unique. Don't accept imitations or adapted products from overseas. MYOB have developed their GST solutions in Australia, specifically for the Australian GST.

- **Powerful, yet simple, award winning software.**

Recognised for their value, ease of use and renowned backup support - MYOB products have been credited with numerous awards such as PC Magazine's 'Editor's Choice', PC World's 'Best Buy', PC User's 'Best Accounting Software' and Window's 2000 'Editor's Award'.

- **Ask your accountant**

More Australian accountants recommend MYOB than any other accounting software - MYOB software makes it easy for you and your accountant to work together.

- **Backed by MYOB's industry-leading support services.**

As well as great software, MYOB Australia also offers the services of one of Australia's leading technical support teams and a nation-wide network of MYOB Certified Consultants.

## MYOB GST-ready business solutions

### MYOB RetailManager

MYOB RetailManager replaces your aging cash register with a revolutionary GST-ready point-of-sale solution for retail businesses. Makes it easy to process all types of sales, manage and monitor your stock and analyse your business performance in seconds. With its comprehensive stock control, stocktake, ordering, customer management, and reporting features - MYOB RetailManager makes simple work out of managing your retail business and handling the GST. Every aspect is designed to save you time, slash paperwork, boost turnover and achieve higher margins. GST is handled "behind the scenes" so you and your staff can get on with retailing instead of tax collecting. MYOB RetailManager also links to the MYOB accounting software range, saving you hours of paperwork and giving you a complete GST solution. Compatible with Win 95/98 or later, NT 4.0 or later.



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Technology  
and collect  
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Points!

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8

(68022) **\$945**

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# MYOB

Web  
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[www.ht.com.au/cat/myob](http://www.ht.com.au/cat/myob)

## MYOB GST-ready business solutions

### MYOB FirstAccounts

The ideal first accounting system and starting point for small service-based businesses. Simple to set up and powerful enough to handle all the needs of small service businesses. MYOB FirstAccounts makes it easy to track income and expenditure, create and print invoices, statements, purchase orders etc. The Card File feature allows you to record the contact details of all your customers and suppliers in the one simple database. Produce Profit & Loss and other key reports with the click of a mouse. GST-READY.

Compatible with Win 95/98 or later, NT 4.0 or later, Mac OS 8.0 or later.

(85770) **\$159**

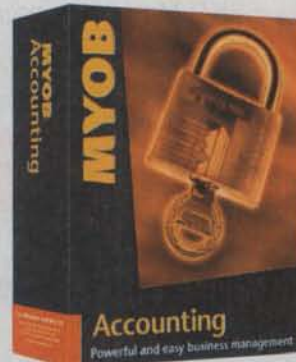


### MYOB Accounting

The simple to use, single-user accounting system which caters for both service and inventory based businesses with around 1-10 employees. The new GST Transitional Assistant automates the otherwise harrowing task of revaluing stock, adjusting invoices & pricing and calculating your Sales Tax Rebate. This innovative feature will save your business countless hours (which means \$\$) and make the move to GST as painless as possible. All MYOB forms — invoices, statements, purchase orders, mailing labels & cheques — can be completely customised to suit the look and needs of your business. MYOB Accounting features: invoicing, receivables, purchasing, payables, cashbook, powerful Inventory, job costing, general ledger, extensive reporting and more. Also includes OfficeLink - the dynamic link to Microsoft Office. Everything you need to build a better business. GST-READY.

Compatible with Win 95/98 or later, NT 4.0 or later, Mac OS 8.0 or later.

(85771) **\$319**



Wine  
on-line?

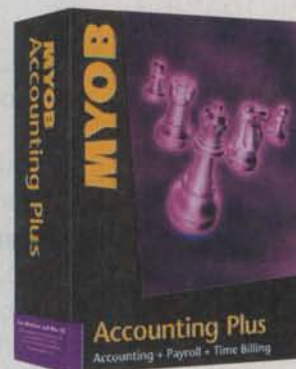


### MYOB Accounting Plus

Extends the functionality of MYOB Accounting with the addition of a professional time billing module and fully integrated payroll. Suited to both service and inventory based businesses with 1-30 employees. The instant a pay is processed, the fully integrated payroll feature automatically updates all related accounts - with no tedious importing or exporting of data required - making pay runs a simple task. Courtesy of the new time billing module - along with meeting the needs of thousands of different types of small businesses - MYOB Accounting Plus is also perfect for professionals such as architects, consultants, lawyers, graphic designers and anyone who bills by the time they spend on a project or with a client. Includes OfficeLink. GST-READY.

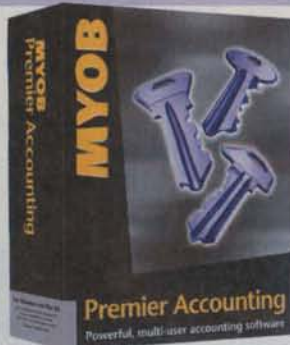
Compatible with Win 95/98 or later, NT 4.0 or later, Mac OS 8.0 or later.

(85772) **\$469**



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1 point for  
every \$5  
spent with  
Harris.



### MYOB Premier Accounting

Includes all the features and functionality of the other MYOB accounting products, plus enhanced inventory (flexible pricing matrix for different types of customers), the ability to handle multiple currencies and powerful multi-user access. Includes 3 user licences - it's easy to add more at anytime. Includes OfficeLink. GST-READY.

Compatible with Win 95/98 or later, NT 4.0 or later, Mac OS 8.0 or later.

(85773) **\$865**

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See Page 2 for  
Locations

JUN  
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## Power & Affordability

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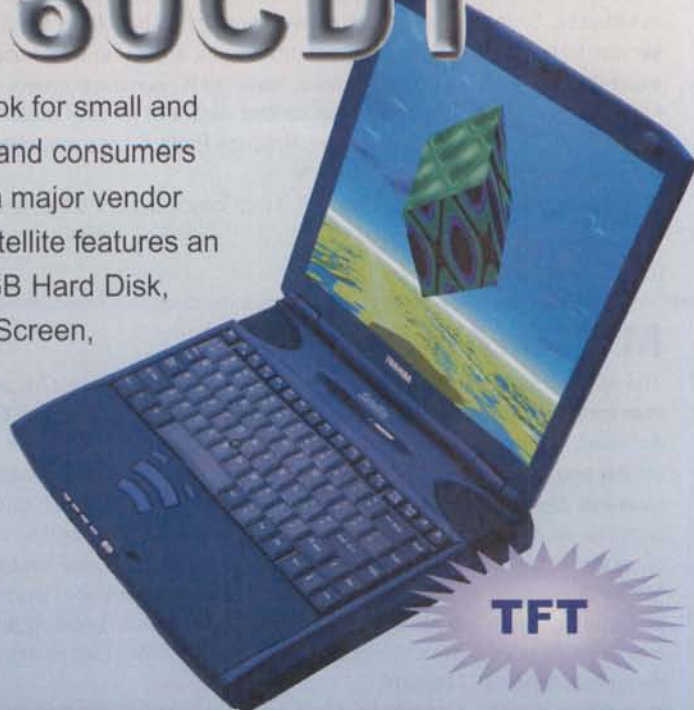
# Satellite 2180CDT

The Satellite series is the ideal notebook for small and medium business, corporate projects and consumers providing the most CPU/Dollar from a major vendor without compromising features. This Satellite features an AMD 475MHz CPU, 64MB Ram, 4GB Hard Disk, Windows® 98, 12.1" Active Matrix TFT Screen, 56KB Modem in an all new case.

(90156)

## \$2,999

Long Term Rent\* T.A.P.\*\* \$25.38 per week



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Direct  
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(at top of  
page)  
for  
more  
products  
and  
info!

## Compare Satellite Models

### Toshiba Install Options

For a small extra charge we can install your chosen options into your new Toshiba: a modem, more information.



Rental Figures quoted are for business use, includes stamp duty and FID for NSW, to approved purchases. Rental price quoted are subject to change for GST - see page 2 for details

	Satellite 2180CDT	Satellite 2670DVD	Satellite 2650XDVD
Processor	AMD 475MHz	Pentium III 450MHz	Celeron 466MHz
RAM Std/Max	64/192 MB	64/192 MB	64/192 MB
Hard Disk	4GB	6GB	6GB
Screen	12.1" TFT	12.1" TFT	14.1" TFT
CD-ROM	Yes	Yes	Yes
Mic & Spkr	Yes	Yes	Yes
Port replicator	No	No	No
Select bay	No	No	No
DVD capable	No	Inc 4xDVD	Inc 4xDVD
Weight	3.1 kg	3 kg	3.1 kg
Warranty	1 Year	1 Year	1 Year
DAA modem	Yes	Yes	Yes
With Windows 95/98 Rent	<b>\$2,999</b> \$25.38/wk/3yrs* (90156)	<b>\$3,790</b> \$32.07/wk/3yrs* (91260)	<b>\$4,679</b> \$39.69/wk/3yrs* (90157)

The award-winning Satellite Series gives you the best of both worlds - power and affordability. The ideal small business or home office mobile computer.

JUN  
10

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## Perfect Solution for Business Professionals

# Satellite Pro 4270XDVD



**8MB  
VIDEO**

**DVD**

The affordable high performance mobile computer. With a range of expansion capabilities, including optional Port Replicator for easy connection to desktop peripherals and accessories, Satellite Pro is the perfect, no-compromise solution for business professionals.

(94172)

# \$4,679

\*SS = Speed Step

Long Term Rent\* T.A.P\*\* \$39.69 per week

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on-line?**

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**Fly Buys.**

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**Fly Buys**  
points on  
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when you  
purchase  
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## Compare Satellite Pro Models

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Kmart

Broadway (Sydney)  
Burwood (Melbourne)

**Kmart  
Shoppers!**  
Not all  
products  
are in-store,  
but  
consulting  
& advice  
available on  
all items

	Satellite Pro 4270XDVD	Satellite Pro 4280XDVD	Satellite Pro 4320XDVD
Processor	Celeron 500MHz	Pentium III 500MHz	Pentium III 600MHzSS*
RAM Std/Max	64/320 MB	64/320 MB	64/320 MB
Hard Disk	6GB	6GB	12GB
Screen	14.1" TFT	14.1" TFT	14.1" TFT
CD-ROM	Yes	Yes	Yes
Mic & Spkr	Yes	Yes	Yes
Port replicator	Optional	Optional	Optional
Video Ram	8Mb	8Mb	8Mb
DVD capable	Inc 6xDVD	Inc 6xDVD	Inc 6xDVD
Weight	3.1 kg	3.1 kg	3.1 kg
Warranty	1 Year	1 Year	1 Year
DAA modem	Yes	Yes	Yes
With Windows 95/98 Rent	<b>\$4,679</b> \$39.69/wk/3yrs* (94172)	<b>\$5,369</b> \$45.46/wk/3yrs* (90158)	<b>\$5,980</b> \$50.53/wk/3yrs* (94178)
With Windows 2000 Rent	<b>\$4,879</b> \$41.30/wk/3yrs* (94173)	<b>\$5,599</b> \$47.30/wk/3yrs* (94177)	<b>\$6,330</b> \$53.53/wk/3yrs* (94179)

JUN

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## The Best Performance at the Best Price

### Tecra 8100

- Intel Celeron 500MHz
- 14.1" TFT
- 64MB RAM
- 6GB HDD
- 24 x CD-ROM
- 3 Year Warranty



Styled for consistent mobile performance, the Tecra 8100 series provides you with the ultimate combination of traditional Tecra investment benefits, high processor performance and a new sleek look and feel.

**DVD  
CAPABLE**

From (94180)

**\$5,479**

Long Term Rent\* T.A.P.\*\* **\$46.38** per week  
Rental prices quoted are subject to change for GST.

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the Web,  
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home or  
office.

- Search on over 34,000 computer products
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## Compare Tecra Models

	Tecra 8100	Tecra 8100	NEW! Coming in June	Tecra 8100
Processor	Celeron 500MHz	Pentium III 600MHzSS*		Pentium III 700MHzSS*
RAM Std/Max	64 MB	64 MB		128 MB
Hard Disk	6GB	12GB		18GB
Screen	14.1" TFT	14.1" TFT		14.1" TFT
CD-ROM	24x max.	24x max.		24x max.
Mic & Spkr	Speakers	Speakers		Speakers
Port replicator	Optional	Optional		Optional
Select bay	Yes	Yes		Yes
DVD capable	Capable	6 x DVD		6 x DVD
Weight	2.8 kg	2.8 kg		2.8 kg
Warranty	3 Years	3 Years		3 Years
DAA modem	Yes	Yes		Yes
With Windows 95/98 Rent	<b>\$5,479</b> \$46.38/wk/3yrs* (94180)	<b>\$7,536</b> \$63.69/wk/3yrs* (94185)		<b>\$Call</b> \$Call/wk/3yrs* (94187)
With Windows NT 4.0 Rent	<b>\$5,659</b> \$48.00/wk/3yrs* (94181)	<b>\$7,669</b> \$64.84/wk/3yrs* (94186)		<b>\$Call</b> \$Call/wk/3yrs* (94188)

\*SS = Speed Step

WINDOWS NT4.0/2000



Pentium® III  
available in  
some Tecra's

JUN  
12

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## Cutting Edge Performance

Check for  
latest prices  
& products

# Portégé

	<b>Coming Soon</b> <b>Portégé 3440CT</b>	<b>Portégé 7200CT</b>
Processor	<b>Pentium III</b> 500MHz,SS*	<b>Pentium III</b> 600MHz SS*
RAM Std/Max	64/192 MB	64/320 MB
Hard Disk	6GB	12GB
Screen	11.3" TFT	13.3" TFT
Display	1024 x768	1024 x768
CD-ROM	Optional	Optional
Mic & Spkr	Yes	Yes
Port replicator	Multi-media	Optional
Select bay	Optional	No
DVD capable	Yes	Yes
Weight	1.6 kg	1.9 kg
Warranty	3 Years	3 Years
DAA modem	Yes	Yes
<b>With Windows 95/98 Rent</b>	<b>\$Call</b> \$Call/wk/3yrs* (xxxxx)	<b>\$6,720</b> \$56.76/wk/3yrs* (94170)
<b>With Windows 2000 Rent</b>	<b>\$Call</b> \$Call/wk/3yrs* (xxxxx)	<b>\$6,845</b> \$57.92/wk/3yrs* (94171)

Portege 7200CT offers Intel®'s powerful Mobile Pentium® III 600MHz processor with Intel SpeedStep™ technology to speed through applications. At 25mm thin and only 2kg, Portege 7200CT packs unprecedented power into its slender charcoal grey and silver magnesium alloy case.



\*SS = Speed Step

### Toshiba Install options

For a small extra charge we can install your chosen options into your new Toshiba: a modem, more information.



Rental Figures quoted are for business use, includes stamp duty and FID for NSW, to approved purchases. Rental price quoted are subject to change for GST - see page 2 for details

## Options for Toshiba Notebooks

For more options see Web Direct Link



### TOSHIBA EDO Memory Upgrades

32MB for Tecra 8000 (not for PIII models)/	
Portégé7000/Satellite 4000	(29356) <b>\$185</b>
32MB for Portégé 3110	(81078) <b>\$205</b>
64MB for Tecra 8000 (not for PIII models)/	
Portege7000/Satellite4000	(29348) <b>\$550</b>
64MB for Portégé 3020	(77229) <b>\$430</b>

### TOSHIBA Battery Packs

For Satellite 4000/4010/2520CDT & others	(21930) <b>\$135</b>
For Portégé 3010/3020 (Lithium Ion)	(73665) <b>\$139</b>
For Satellite 4000 Series	(72109) <b>\$127</b>
For Tecra 8000 (Lithium Ion)	(29358) <b>\$278</b>

### TOSHIBA High Capacity Battery Packs

For Portégé 3010/3020	(72475) <b>\$278</b>
For Portégé 7000/7020	(66479) <b>\$330</b>

### TOSHIBA Battery Charger

For Tecra 8000	(29357) <b>\$435</b>
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### TOSHIBA Universal AC Adapter

For Tecra 8000/Satellite 4000/4010 & others	(44200) <b>\$134</b>
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### TOSHIBA Additional 2 Year Warranty

For Satellites with TFT Display	(21729) <b>\$182</b>
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### TOSHIBA Port Replicators

For Tecra II 750/780/8000	(79226) <b>\$725</b>
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### TOSHIBA Desk Station V+

For Tecra 500/550/650/700/750/8000 Series	(25446) <b>\$1,352</b>
---	------------------------

### TOSHIBA Carry Bags

Toshiba Friend Carry Bag	(75901) <b>\$78</b>
Leather Bag for A4 Notebooks	(68408) <b>\$205</b>
Classic Leather Notebook Carry Bag	(79770) <b>\$207</b>

For more Toshiba options  
see Web Direct Link  
or call 1300 13 9999

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2

**Make it Easy**

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3

**Stay Ahead**

- Renting equipment is easy to upgrade to the latest technology.

4

**Get More**

- Renting lets you get all the equipment you need **NOW!**

5

**More Choice**

- Find the equipment that best suits your needs, and rent and **SAVE**

6

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Rental repayments include GST from 1 July 2000. Repayments will increase up to 10%. This increase will apply to all rentals whether entered into before or after 1 July 2000. If you are in business you may be entitled to an input tax credit of up to 100% of the GST part of any repayment you make. You should seek your accountant's advice as to your entitlement.

\* RentSmart is available to qualifying customers on selected products with a total retail value above \$500.

\*\* Subject to equipment availability. Rental repayments may be subject to change for GST

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## Make a Smart IT Investment

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### Acer TravelMate Notebook Series

*The Perfect combination of  
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design elements.*

Model	341T CD	341T DVD
Screen	12.1" TFT	12.1" TFT
CPU	PIII 500MHz	PIII 500MHz
Memory	64MB	64MB
HDD	6GB	6GB
CD-ROM	24xCD	NO
DVD	NO	<b>2xDVD</b>
Fax/Modem	56Kbps	56Kbps
LAN Card	10/100 LAN	10/100 LAN
Op. system	Windows® 98	Windows® 98
Part number	(94817)	(94818)
RentSmart*	\$42.23/week	\$45.69/week
Price	<b>\$4,995</b>	<b>\$5,395</b>



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\*Metropolitan areas only.

Acer Australia



See page 4 for more  
information on BizSmart.

(BizSmart only available with  
TM514T & TM514TXV)

Model	507DX	514T	514TXV
Screen	12.1" HPA	12.1" TFT	14.1" TFT
CPU	Celeron® 466MHz	Celeron® 466MHz	Celeron® 466MHz
Memory	64MB	64MB	64MB
HDD	4.8GB	4.8GB	6.0GB
CD-ROM	24xCD	24xCD	NO
DVD	NO	NO	<b>2xDVD</b>
Fax/Modem	56Kbps	56Kbps	56Kbps
LAN Card	NO	NO	NO
Op. system	Windows® 98	Windows® 98	Windows® 98
Part number	(94819)	(89638)	(94821)
RentSmart*	\$22.84/week	\$26.30/week	\$37.15/week
Price	<b>\$2,695</b>	<b>\$2,997</b>	<b>\$4,395</b>

\*RentSmart  
The figures  
shown are  
based on a per  
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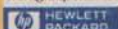
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## HP Omnibook Series

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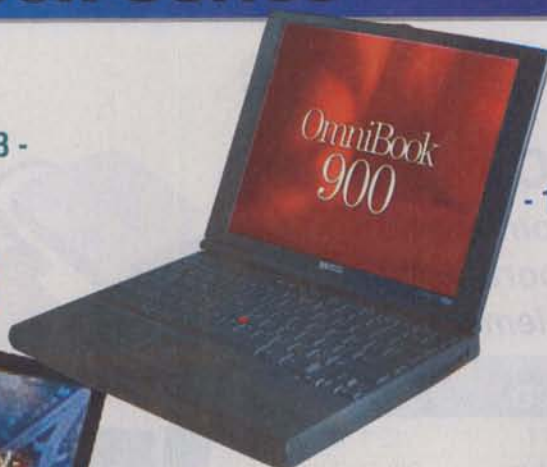
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**Model XE2: C 450 - 64MB -  
4.8GB - 12.1" TFT**  
From: (92922)

**\$3,285**



**Model 900: PIII 500 -  
64MB - 12GB - 13" XGA**  
From: (99110)

**\$5,139**

**Model 4150: PIII650  
- 128MB - 18GB - 14.1" XGA**  
From: (94684)

**\$8,270**



CPU/MHz	HDD	RAM	Screen	CD-ROM/DVD	Modem	OS	Part #	Rent/wk	Price
<b>Omnibook XE2</b>									
Celeron 450MHz	4.8GB	64MB	12.1" TFT	24xCD-Rom	56K	Win95/98	(92922)	<b>\$27.92</b>	<b>\$3,285</b>
Pentium III 500MHz	6.0GB	64MB	14.1" TFT	6xDVD	56K	Win95/98	(94683)	<b>\$40.15</b>	<b>\$4,750</b>
<b>Omnibook 900</b>									
Pentium III 500MHz	12GB	64MB	13" XGA	No	No	Win95/98	(99110)	<b>\$43.69</b>	<b>\$5,139</b>
Pentium III 500MHz	12GB	64MB	13" XGA	No	No	WinNT4	(87324)	<b>\$46.15</b>	<b>\$5,449</b>
<b>Omnibook 4150</b>									
Pentium III 650MHz	18GB	128MB	14.1" XGA	6xDVD	No	Win95/98	(94684)	<b>\$69.92</b>	<b>\$8,270</b>
Pentium III 650MHz	18GB	128MB	14.1" XGA	6xDVD	No	WinNT4	(94685)	<b>\$71.76</b>	<b>\$8,470</b>

T.A.P. - Based on 3 year term for business use. Rental prices subject to change for GST.

### HP Jornada 680 Handheld

A convenient and versatile PC companion that's prepared for any journey. The HP Jornada 680 provides all the tools you need to manage your personal information while you're away.

(77645) **\$1,545**



### Jornada 820 Palmtop

8.2" VGA, 640 x480, 256 colour display, 190MHz, 16MB RAM, 16MB Burst Mode ROM, Windows CE 2.2, Pocket editions of Ms Word, Excel, Powerpoint Outlook, Internet Explorer.

(71162) **\$1,695**



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# HP Networks & Servers

## HP PROCURVE

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### HP ProCurve 2224 Switch



Low-cost desktop switch ideal for delivering performance to workgroups with a mix of 10Mbps and 100Mbps devices and for migrating from 10Base-T to 100Base-TX:

- 24 10/100Base-TX autosensing ports
- One open transceiver slot
- Unmanaged
- Low, industry-leading price

(75515)

**\$1,199**

### HP ProCurve Switch 2424M



Desktop switch ideal for low-cost migration to 10/100 stackable switching:

- 24 10/100Base-TX autosensing ports
- Open module slot for Gigabit stacking and uplinks
- Managed
- Low industry-leading price

(75513)

**\$2,499**

### HP ProCurve 4000M Switch



A feature-rich, modular 10/100/Gigabit desktop switch that provides scalable, low-cost switching and all the benefits of HP Proactive Networking. Ideal for medium-to-large businesses looking for scalable, expandable, low-cost migration to 10/100/Gigabit switching to the desktop.

(66063)

**\$4,479**Optional Gigabit Module for  
4000M (76563) **\$2,025**

### HP ProCurve Switch 408

Unmanaged 8 port 10/100 switch in a compact sized package. This switch offers half/full duplex, 10/100 autosensing on every port. Warranty: Lifetime, Exchange Next Day (79125)

**\$519**

\*\*\*PLEASE NOTE THAT PRICES ARE SUBJECT TO CHANGE ON ALL PRODUCTS\*\*\*



## NETSERVER E-60

### HP E-60 - Pentium III 550MHz

- \*PIII-550 with 512Kb Cache
- \*Dual Processor Capable
- \*64MB 100MHz ECC SDRAM
- \*RAM upgradeable to 1GB
- \*Dual-Ch Ultra-Wide SCSI Controller
- \*9.1Gb SCSI Hard Disk
- \*CD-ROM
- \*PS/2 Keyboard and Mouse

(84911)

**\$4,269**

RentSmart \$36.23/Week\*

### HP E-60 - Pentium III 600MHz

- \*PIII-600 with 512Kb Cache
- \*Dual Processor Capable
- \*64MB 100MHz ECC SDRAM
- \*RAM upgradeable to 1GB
- \*Dual-Ch Ultra-Wide SCSI Controller
- \*9.1Gb SCSI Hard Disk
- \*CD-ROM
- \*PS/2 Keyboard and Mouse

(97336)

**\$4,398**

RentSmart \$37.15/Week\*

All systems include: 7 mass storage shelves (4 available after floppy, CD-ROM &amp; 9GB disc), 6 expansion slots (5PCI, 1PCI/ISA combination), integrated 10/100 network interface, and HP TopTools for Servers Management Platform.

\*T.A.P. - Based on 3 year term for business use. Rental prices quoted are subject to change for GST.

HP NetServers are ideal for all the small to medium businesses that demand the most out of their network server. So why trust your business to a generic box, when you could have the reliability and performance to troubleshoot, and at a price that is easy on your finances.

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## SMALL BUSINESS GST BUNDLE

**QuickBooks V.7** "PC Magazine Editor's Choice- April 2000"

*"The world's leading financial management software tailored to your small to medium business"*

Comprehensive business and financial management software;  
Cash or accrual accounting; Financial reporting including Balance Sheet, Profit & Loss and Cash Flow; Fully integrated QuickBooks On-line Banking; GST ready\*

\*Free GST updates (including these features) will continue to be made available to registered QuickBooks V7 customers up until 1st July, 2000 to ensure that all the GST ready functionality outlined is provided. Subject to ATO requirements and changes in government legislation.

**2<sup>n</sup> Amaze**  
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### AMAZE N500

- Intel Celeron 500 CPU
- 32MB PC100 Memory
- 6.4GB hard drive
- On-board CODEC Sound & Video
- 1.44MB floppy drive
- 48x CD-ROM drive
- Mini Tower Case
- 15" Multimedia monitor
- Keyboard
- 4-Button Scroll Mouse
- Microsoft Windows 98
- Quicken QuickBooks V.7
- 3 Years On-site Warranty

FROM (99213)

**\$1,575**

(99755) Without Monitor **\$1,349**



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## Power and Portability

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# Armada

With stability, quality and reliability, this easy-to-use notebook delivers beyond the latest key core technologies and value for money



Armada V300



Armada E500



Armada M700

	V300	E500	E500	M700
Processor	C466MHz	PIII600MHz	PIII650MHz	PIII500MHz
RAM	32MB	64MB	64MB	64MB
Hard Disk	6GB	12GB	12GB	12GB
Screen	13" CSTN	14.1" CTFT	14.1" CTFT	14.1" TFT
Display	800 x 600	1024 x 768	1024 x 768	1024 x 768
CD-Rom	24x max	24x max	24x max	Optional
Battery Life	up to 3 hrs	up to 3 hrs	up to 3 hrs	up to 3 hrs
DVD	Optional	Optional	Optional	4xDVD-Rom
Modem	56K	56K	56K	56K
Warranty	1 year	1 year	1 year	1 year
Op System	Win 95/98	Win 95/98	Win NT 4.0	Win 95/98
Rent 3 Yrs*	<b>\$23.07</b>	<b>\$42.23</b>	<b>\$48.69</b>	<b>\$50.30</b>
Inc Tax	<b>\$2,729</b>	<b>\$4,998</b>	<b>\$5,750</b>	<b>\$5,936</b>
Part Number	(99724)	(99722)	(99723)	(89024)

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# ProLiant Server

## Compaq ProLiant ML350HP M6/600-9100

Ideal server for corporate infrastructure (file/print) and growing small and medium companies. Latest performance and investment protection with 133MHz memory and processor bus speeds and 64-bit PCI slots. Entry availability features at a value price. Hot-plug and non-hot-plug hard drive models (non-hot-plug model can be later upgraded to hot-plug).

- Pentium III 600MHz, 256Kb cache
- 133MHz system bus
- Dual processor capable
- 128MB ECC SDRAM (max 2GB)
- 3.5" 1.44MB Floppy disk drive
- 32x CD-ROM drive
- 4 hot plug hard drive bays
- 32 and 64bit PCI slots
- 9.1GB Ultra2 hot plug hard disk drive
- Dual Channel Ultra2 SCSI controller
- Integrated NC3163 10/100 NIC with WOL

(95952)

**\$5,829**



\*Rental rate for business use, includes stamp duty and FID for NSW. T.A.P. Rental prices quoted are subject to change for GST.

GST May apply to commitments made now! See page 2 for details.

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## Notebooks, Desktops & Servers



### ThinkPad i Series

- \* Pentium III 500MHz
- \* 64Mb SDRAM
- \* 12Gb Hard Disk Drive
- \* CD/DVD Drive
- \* 15" TFT (Active Matrix) Screen

(99619) **\$4,995**

Rent\* T.A.P.\*\* for **\$42.23**  
per week over 3 years

**GST may apply on Commitments made now!**  
Please note that the GST tax may apply to purchases and commitments made prior to 1st July 2000. Harris Technology reserves the right to charge GST on all purchases or commitments which incur GST Liability

### ThinkPad 390x

- \* Celeron 400MHz
- \* 64Mb SDRAM
- \* 6.4Gb Hard Disk Drive
- \* CD Drive
- \* 14.1" TFT (Active Matrix) Screen

(86510) **\$3,650**

Rent\* T.A.P.\*\* for **\$30.92**  
per week over 3 years



### PC300PL Pentium III

- \* 533MHz Model
- \* 64Mb RAM Standard
- \* 10.1Gb Ultra ATA HDD with S.M.A.R.T. III
- \* 40x CD-Rom
- \* Microsoft Windows 98 2nd Edition

(86447) **\$3,159**

Rent\* T.A.P.\*\* for **\$26.76**  
per week over 3 years



### Aptiva 80A Pentium III

- \* 667MHz Model
- \* 128Mb RAM Standard
- \* 15Gb Ultra ATA HDD with S.M.A.R.T. III
- \* CD-RW Drive
- \* Microsoft Windows 98 2nd Edition
- \* 15" Monitor

(98069) **\$2,995**

Rent\* T.A.P.\*\* for **\$25.38**  
per week over 3 years

## Netfinity 3000/5000 Servers

### Netfinity 5000

- \* Pentium III 600MHz
- \* 128MB RAM standard
- \* Maximum storage capacity 91GB
- \* 512KB Level 2 Cache
- \* CD-ROM 32x max
- \* Dial-in for control/monitoring/remote management
- \* Ethernet Integrated Network Interface
- \* Slots and bays (total/available) PCI/ISA

(82774) **\$4,765**

Rent\* T.A.P.\*\* for **\$40.38**  
per week over 3 years



### Netfinity 3000

- \* Pentium III 550MHz
- \* 128MB RAM standard
- \* Maximum storage capacity 91GB
- \* 512KB Level 2 Cache
- \* CD-ROM 32x max
- \* 10/100BaseTX Integrated Network Interface

(92709) **\$2659**

Rent\* T.A.P.\*\* for **\$22.61**  
per week over 3 years

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## QuickCam™ Express

Snap stills. Shoot video. Email them anywhere in one click. Make live video calls! **QuickCam™ Express** – The simple way to get closer™.

- Capture stills and video instantly
- Email images with a single click
- Meet face-to-face online
- Over 2 million QuickCams sold
- USB connector for easy installation
- Works with Windows® 95 or 98



(80121) **\$80**

## QuickCam™ Web

With **QuickCam Web** and its built-in microphone, you can easily make live video calls over the Internet. With Logitech's exclusive software, you can automatically broadcast images from your life, room, whatever - live over the Internet: It is called Web camming! And you can even create web pages featuring your videos and pictures captured with **QuickCam Web**. Requires Windows® 98 and USB.



(87552) **\$189**

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Not all products are in-store, but consulting & advice available on all items

## QuickCam Pro USB

True 640x480 resolution for stunning videos and pictures. With the QuickCam software, build fun web pages complete with streaming video or make live video calls (includes a Labtec microphone) over the Internet. Add titles, fade-in and fade-outs, audio tracks and more to your videos. Enhance your pictures with special effects such as sharpen, blur and more. And with the included digital surveillance software, easily set up a digital security camera.



(70566) **\$259**

## Internet Keyboard with iTouch

The Logitech Internet keyboard and iTouch software put one-touch Internet and multimedia control at your fingertips. Responsive keys provide an exceptional touch. Relax your hands on the attractive palm rest during breaks, and easily remove it for extra space. 3-year warranty.



(60332) **\$59**

Marble Mouse (69760)

**\$84**



Cordless Wheel Mouse (77761)

**\$89**



Cordless MouseMan Wheel (78677)

**\$109**



## Cordless Desktop iTouch

A cordless keyboard and cordless wheel mouse combination to free you from cords that tangle. No pointing at the computer or clear path required. With convenient iTouch Internet and multimedia control, access the Internet, search, open e-mail, play CDs, DVDs or MP3 and more with one touch of a key. 5-year warranty.



(82772)

**\$159**

## Cordless Desktop Pro

Cordless keyboard designed for easier typing and contoured soft-touch cordless wheel mouse free you from tangled cords. Innovative mouse design maximises comfort and control. Features convenient iTouch Internet and multimedia controls. 5-year warranty.



(87605)

**\$239**

## SoundMan X1 Speakers

Experience the full richness of CDs, MP3 and multimedia. Innovative compact design delivers realistic, high definition sound for PC's, portable CD players and TV. High definition sound with solid bass - 25 Watts RMS.

- Excellent for CD music, Internet and MP3 audio
- 3 year warranty



(81655)

**\$135**

## Mini Wheel Mouse

- Finally a comfortable and portable wheel mouse!
- Short 80cm cable, ideal for notebooks
- USB and PS2 connection
- Includes extension cable for desktop use
- Ideal for right or left handed users
- Your best value in scrolling/zooming mouse

**!!NEW!!**



(97717) **\$68**



## Cost-effective Connectivity Solutions

### Gigabit Switches

These 3 new gigabit switches from Netgear make it possible for small businesses and branch offices to fulfill requirements for higher bandwidth as their networks become increasingly congested. The switches provide customers a faster server connection and allow multiple Fast Ethernet users to access the server at 100 Mbps at the same time.

**FS 510T** (rrp) **\$2,399**

Eight switched 10/100Mbps ports + two 1000Mbps port (Category 5)

**FS 518T** (rrp) **\$3,999**

Sixteen switched 10/100Mbps ports + two 1000Mbps ports (Category 5)

**GS 504T** (rrp) **\$4,399**

Four full-duplex Gigabit Category 5 ports

**GA 620T** (rrp) **\$949**

Gigabit Network Interface Card



Please Note that Fibre Gigabit Switches are also available

### RT 338 ISDN Router

Latest technology with ease-of-use designs

Compatible with all major Internet ISDN equipment, this is the ideal router for Internet access, LAN-to-LAN connection, and remote access for a single user, small business or branch office over ISDN. Includes auto sensing input 10/100 network port & caller ID on phone ports.



(97718)

**\$725**

### RM 356 Analog Modem Router

Connect multiple PCs to the Internet easily

Router + integrated 56K modem + integrated 4-port 10BaseT hub • DHCP server • Dynamic NAT+ • Dial-on-Demand-routing • Hi/fn (STAC LZS) compression • 5 year warranty



(70197)

**\$558**

### 10/100Mbps Fast Ethernet Switches

The NETGEAR FS105 and FS108 feature 5 or 8 switched 10/100 Mbps ports, auto-speed and duplex mode sensing. Versatile and compatible. Compact and easy to install. Vista jacks with built-in LEDs.

**FS 105** 5-port Autosensing (84722) **\$216**

**FS 108** 8-port Autosensing (70905) **\$429**



The NETGEAR FS516 & FS524 switches provide powerful, network center performance with all 16 or 24 ports capable of 10 or 100 Mbps, half- or full-duplex operation, automatic speed sensing. Ideal for segmenting networks into small, connected subnets. Vista network ports with built-in LEDs.

**FS 516** 16-port Autosensing (60522) **\$1,125**

**FS 524** 24-port Autosensing (77549) **\$1,327**



### RT 311 Cable/DSL Internet

Connect multiple PCs to share single IP address

The NETGEAR RT311 provides NAT service that allows up to 32 users on your 10/100 network to share the high-speed Internet connection. At the same time it also provides firewall protection to guard your network against hackers and unauthorised access from the Internet.



(97719)

**\$579**

RRP

### RT 328 ISDN Router

Home office Internet access in a box

Includes built-in ISDN TA, 128 MultiLink PPP, DHCP Server, Dynamic NAT+, Dial-on-Demand Routing. Provides Internet access, LAN-to-LAN intranet connection, and remote access for a single user, a small business, or a branch office over ISDN.



(68900)

**\$629**



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## Take the Work out of Networking

Delivery  
Australia-wide

### 10/100Mbps Starter Kit



This Network Starter Kit contains everything that Windows users need to start networking right away, all in one box. Includes 4-port 10/100 Mbps hub, two 10/100 PCI NICs, two cables and an installation guide.

DB 104 (77292) **\$264**

Free  
modem sharing  
software

### 10Mbps Starter Kit

With this simple and affordable pack, NETGEAR brings the benefits of networking into the hands and budget of small businesses.



Includes 4-port 10/100Mbps hub, two 10/100 PCI NICs, two cables and an installation guide.

SB 104 (13277) **\$157**

Netgear offers  
free, 24-hour  
phone support

### 10Mbps Ethernet Hubs



Vista jacks with built-in LED indicators • Uplink port for network expansion • Slim, sturdy metal case design • BNC/AUI backbone support option • Limited lifetime warranty • Easy plug and play installation

EN 104TP 4-port Slimline (53456) **\$75**

EN 108TP 8-port Slimline (53458) **\$105**

EN 116 16-port Slimline (53459) **\$239**

EN 516 16-port Rackmount (17425) **\$237**

EN 524 24-port Rackmount (17435) **\$337**



- 16 or 24 10BASE-T ports
- Easy plug and play installation
- Vista network port with built-in LEDs
- BNC/AUI backbone support
- Internal power supply

### Printer Servers

The NETGEAR print servers let you share any parallel printer among all users on the network without having to dedicate a PC for print serving and without complex setup and configuration. These print servers connect directly to the network and can be placed anywhere convenient to the users.

With a built-in network 4 port hub, the PS105 is an all-in-one connectivity solution for the SOHO users- providing file, print and resource sharing as well as network gaming.



PS 105 10Mbps Print Server (67225) **\$230**



The PS110 attaches to a 10 or 100Mbps hub or switch, providing effortless transition from Ethernet to Fast Ethernet. It also supports 2 parallel printers.

PS 110 10/100Mbps Print Server (67226) **\$285**

### 10/100 Dual Speed Hubs

These Netgear hubs connect multiple PCs to share printers, files, Internet access and e-mail communications. Mix & match 10 and 100Mbps PCs, servers and peripherals on the same network with ease and without the high cost and complexity of multiple hubs and bridges. All feature easy, plug and play installation, auto-sensing dual speed ports and vista network ports with built-in LEDs.



DS 104 4-port Slimline (70795) **\$169**

DS 108 8-port Slimline (18755) **\$269**

DS 116 16-port Slimline (81519) **\$469**

DS 524 24-port Stackable (69474) **\$970**

Stack up to 8 hubs via provided cascade cables. Includes rack-mount kit. Plug and play installation.



NETGEAR™

Ethernet  
Adapter 10/  
100 PCI



(53460)

**\$55**

PCMCIA  
10/100 Mbps  
Network Card



(60071)

**\$165**

USB  
10 Mbps NIC



(81289)

**\$99**

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# Modem's and Networking

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## PC Cards

Megahertz® 56K Global Modem PC Card with XJACK® Connector

(82823) **\$329**



XJACK® Connector on 3Com® Megahertz® 56K\* Global GSM and Cellular Modem PC Card. A new XJACK® connector on the 3Com® Megahertz® 56K\* Global GSM and Cellular Modem PC Card lights to show connection status and still saves you from carrying or losing cables. Made from high-strength, heat-resistant Lexan. Simply pop it out and plug in any standard phone cord. Initiate a call and it blinks, then stays lit once connected.

\*Capable of receiving downloads at up to 56 Kbps and sending at up to 31.2 Kbps. Actual download speeds you experience may be lower due to varying line conditions. Requires compatible analog phone line and server equipment.

## US Robotics Modems



(Pictured is USA model)

**\$189**

56K Fax Modem (63833)

**Modem features:** Fax forwarding • Delayed and broadcast sending • Send faxes from any Windows application • Send and receive while running other applications • Faster Internet downloads for a more exciting

3Com Megahertz® 56K Global PC Card V.90 (58084)

**\$316**

3Com EtherLink 10/100 Cardbus PC Card with XJACK® (74695)

**\$320**

**\$219**



56K Message Modem (70929)

**BOTH modems feature:** Answering machine • Message Management • Store voice and fax messages • Flash ROM upgrade.

**The Professional Message Modem ALSO features:** Full duplex speakerphone • Record faxes and voice messages while PC is switched off.

**\$275**



56K Professional Message Modem (70928)

## HUBS AND SWITCHES

High Density Plug and Play Ethernet Switch for Small Businesses

**IDEAL for the OFFICE**



OfficeConnect® hubs are designed for scalability: you increase port density only when you need it. As your business grows your OfficeConnect network can expand easily by connecting additional devices.

**OfficeConnect Hubs:**

Eth Hub 8 (82812) **\$185**

Eth Hub 8C (82813) **\$235**

8/TPM (28873) **\$783**

Eth Hub 4C (82815) **\$169**

## OfficeConnect Networking Kits



The 3Com OfficeConnect networking kits include everything you need to network two or

more personal computers including NICs, hubs, cables and complete easy to use documentation.

**OfficeConnect SME 2-User Kit (79020) \$189**

**Kit includes:** • One OfficeConnect Hub TP4



- Two EtherLink III ISA 10BaseT NICs
- Two 0.76m UTP cables
- An external power supply

**OfficeConnect SME 3-User Kit (57134) \$495**

**Kit includes:** • One OfficeConnect Hub 8/TPC  
• Three EtherLink III ISA 10BaseT NICs  
• Three 1.52m UTP cables  
• An external power supply



## OfficeConnect Fast Ethernet Switches



With plug and play installation and no configuration required, the OfficeConnect switch is supremely easy to use. Provides full wire rate Ethernet and Fast Ethernet switching for your unmanaged office network.

**OfficeConnect Switch 400 (67221) \$569**

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## Simply Connecting the World

### INAT-FS708: 10/100TX-sw x 8 ports



(99697)

**\$539**

Physical specs: 251mm by 118mm by 37mm, .8kg, (9.88" x 4.65" x 1.5", 2.3lbs)

Features:

- 10/100Mbps auto-negotiation
- MDI/MDI-X switch for port 8.
- Flow control support
- Compact size for desktop use.
- Includes rackmount and wallmount kits.
- Limited Lifetime warranty. (one year for power supply and fan)

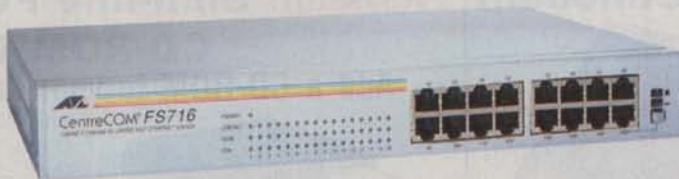
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\* Offer valid until 30/06/00

### INAT-FS716: 10/100TX-sw x 16 ports



(99698)

**\$990**

Physical specs: 330mm by 203mm by 44mm, 2.16kg, (13" x 8" x 1.72", 4.75lbs)

Features:

- Supports 8,192 MAC address
- 10/100Mbps auto-negotiation
- MDI/MDI-X switch for port 16.
- Flow control support
- Includes rackmount kit
- Limited Lifetime warranty. (one year for power supply and fan)

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sticking of CD's.



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**\$20**



For 48 CD's:  
(79584)

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Vertical in-ear  
stereo headphone  
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microphone  
boom. Ideal for  
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Designed for  
multimedia  
convenience.  
Lightweight and  
compact,  
adjustable  
headband. (Must  
be powered by  
a soundcard)  
(77819)

**\$19**

## CD-R/CD-RW: Storage for life

### Signature III Colour CD Printer



#### Personalise your CD's

The Signature III Colour CD Printer is a new, third generation ink-jet CD Colour printer from industry leader Primera Technology. It combines the fastest print speed ever offered with the highest print resolution available in the world today: 1200x1200dpi for a stunning 1.44 million pixels per square inch.

(89186)

**\$2,895**

### Comet Autoloader for Signature Printers

#### Hands Free CD Printing!



The Champion Comet is the first economical, desktop printer loader designed for the Signature II and III printers. The loader stacks up to 50 printable discs then loads them into the printer tray. After printing, the discs are deposited into the output tray.

Printer pictured but not included

(97769)

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### CopySmart Cd Duplicator



**NEW  
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#### 4x Write, 4x ReWrite, 32x Read

#### COPYSMART 4x 4x 32x CD DUPLICATOR

As easy to use as a photocopier!

Stand-alone or PC connected one-to-one duplicator able to record to both CD-R and CD-RW media. 4x CD-R, 4x CD-RW copy functions. Simple 4 button interface allowing Speed selection, Test, Copy, Compare and Quick Erase. PC based Data and Audio copying Software included.

**NEW!!!**

(92173)

**\$1,895**

### Verbatim 56K CompactModem

Compatible with Windows®  
CE based Palm PCs and  
Handheld PCs



The Pretec CompactModem from Verbatim is the world's first and smallest 56kbps Fax/Modem card for Windows CE based Palm PCs and handheld PCs. Video conferencing ready. Supports V.80 application for synchronous H.324 streaming. Supports V.90 and K56flex. Win 95/98/NT/CE compatible. By connecting the CompactFlash adapter included, this modem also becomes a fully-fledged PC card able to be used with most laptops/notebooks.

(83607)

**\$299**

### Verbatim Slim-line PC Card CD-ROM Drive

Add a CD-ROM to your Laptop!



This 24x CD-ROM can connect to any PC Card enabled PC or Notebook and is ideal for mobile computing for notebook users with no CD-Rom drive built-in. The drive

is plug-and-play making installation a breeze and the slim-line tray reduces the size of traditional external PCMCIA CD-ROM drives through its lightweight and low profile design. The control panel on the top of the case allows for easy playback of audio CD's

(97766)

**\$345**



Verbatim

### CD Media

#### Writable: (CD-R)

74 min. 650MB

Single (74740)

#### ReWritable: (CD-RW)

74 min. 650MB

2x/4x Speed

74 min. 650MB

10-pack (76731)

80 min. 700MB

Single (87392)

DataLife Plus envelope

74 min. 650MB

10 pack (99682)

**\$2**

**\$19**

**\$3**

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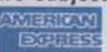
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## Pipeline Networking Series

The Pipeline series is a broad range of easy to use ISDN routers, bridges and terminal adapters. They each have the bandwidth, speed, protocol support and security you need for fast, reliable, and safeguarded communications. The Pipeline range all come standard with the Secure Connect Firewall Software.

### >> Pipeline 50

The Lucent Pipeline 50 is an Ethernet to ISDN router/bridge. It **allows** an unlimited number of users high-speed access to a corporate headquarters or the Internet.

#### Features

- Concurrent bridging and routing. BCP standard bridging. IP, IPX and Appletalk routing.
- VPN ready **with 40-bit IPsec encryption** (optional upgrades to **56-bit/3DES**)
- Industry standard user authentication
- ATMP tunneling
- Advanced functionality



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(19379)

**\$1,279**

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### >> Pipeline 75

The Lucent Pipeline 75 is an Ethernet to ISDN router/bridge. It has dual analog telephone ports that offer an unlimited number of users high-speed access to a corporate headquarters or the Internet.

#### Features

- Concurrent **BCP standard bridging** and routing. IP, IPX and Appletalk routing.
- VPN ready **with 40-bit IPsec encryption** (optional upgrades to **56-bit/3DES**)
- SmoothConnect features **for easy configuration**
- Industry standard user authentication
- **Integrated analog/digital capabilities**
- ATMP tunneling
- Advanced functionality



**SPECIAL!**  
**LOW PRICE**

(94841)

**\$1,446**

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### >> Pipeline 85

The Lucent Pipeline 85 is an Ethernet to ISDN router/bridge. It has analog capabilities and an integrated 4-port 10base-T hub.

#### Features

- Concurrent **BCP standard bridging** and IP, IPX, and Appletalk routing.
- VPN ready **with 40-bit IPsec encryption** (optional upgrades to **56-bit/3DES**)
- SmoothConnect features **for easy configuration**
- Integrated analog/ digital capabilities
- Industry standard user authentication
- Integrated four port Ethernet hub
- ATMP tunneling
- Advanced functionality



**SPECIAL!**  
**LOW PRICE**

(79352)

**\$2,785**

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(92739) **\$383**



Realport2 10/100  
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Realport2 CardBus 10/  
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(92756) **\$330**

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Value 56K Modem



- Speeds up to 56Kbps
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- LED status
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(72923) **\$227**

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2

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3

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- Half or full duplex at both speeds for increased network performance
- Two Diagnostic LEDs per port provide connection status at a glance
- Dedicated bandwidth to each user



NetStation  
8 Port



NetStation  
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- USB compatible
- 8MB Picture Card
- Photodeluxe Pagemill and Photoprinter Software
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(80361)

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### Kodak DC215 Zoom

It's a snap to use, thanks to the award-winning interface and controls. And we've packed all this functionality into a silver metal-skinned design, among the most compact on the market.

- 1 Million pixel resolution
- 2x wide angle (29-58mm) optical glass zoom lens
- 4MB picture card
- USB Card Reader included



(80360) **\$429**

### Kodak DC215 Millennium

Represents outstanding value for money with USB card reader for up to 10 downloads. Stunning Gold Metal-skinned design amongst the best on the market.

- 1 Million Pixel Resolution
- 2x wide angle (29x58mm) optical glass zoom lens
- 4Mb picture card
- Photodeluxe and pagemill software
- USB card reader included



(81279)

**\$559**

\*1500 Bonus Fly Buys Points

### Kodak DC290

The model of choice for high-end business picture takers. It gives you the ultimate in digital control thanks to its ability to "learn" scripts and applications—much like you'd customize your PC with different software.

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- Up to 3.3 Million Pixel Interpolated Resolution
- 3x Optical and 2x Digital Zoom
- JPEG and Uncompressed TIFF File Format
- Audio record and playback
- Burst capture mode
- 16MB Picture Card
- Rechargeable batteries/charger included



\*1500 Bonus Fly Buys Points

(84735)

**\$1,499**

### Kodak DVC 325

The KODAK DVC325 Digital Video Camera is the easy, fun way to capture and share quality digital pictures and video.

- Full motion video up to 30 frames per second
- Great 640x480 Still Images
- USB Interface
- Create videos that include text, video, audio and special effects with Presto! Videoworks software included
- Standard Tripod Socket



(80362) **\$172**

### Kodak 4804IDE CD-R/RW Writer

- 24x Read, 4x CDR Write, 4x CDRW Write
- Disk-at-once and Track-at-once mode recording
- ATAPI Enhanced IDE Interface
- Gazo Personal Imaging Warehouse software



(84028) **\$449**

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(62677)

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#### 64MB Picture Card

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plus Remote Access Server**

<b>DP-300</b>	Dual Speed 10/100Mbps Multiprot Print Server 2 parallel 1 serial	(53598) <b>\$399</b>
<b>DP-602</b>	Internet Server	(81535) <b>\$419</b>
<b>DP-692 NEW!</b>	2 port Internet Server with built in 9 port hub and uplink	(85108) <b>\$485</b>
<b>DP-601M NEW!</b>	Internet Server for SOHO network with built in 56K modem	(85107) <b>\$479</b>

**Network Adapters also available**

<b>DE-660CT</b>	PC Card 10Mb with RJ-45/BNC connectors	(35862) <b>\$105</b>
<b>DFE-530TX</b>	PCI bus dual speed 10/100Mb network card	(62956) <b>\$59</b>
<b>DGE-500SX</b>	PCI-bus 1000Mg Gigabit Ethernet Network Interface Card	(90752) <b>\$899</b>
<b>DMF-560TXD</b>	56K Modem/fax ethernet 10/100 dual speed N-way PCMCIA card - NO DONGLES - Direct port	(98305) <b>\$369</b>
<b>DFE-660TX</b>	PC Card 10/100 Base-TX Dual Speed	(69449) <b>\$145</b>

### D-Link DES-1008D



This switch is designed to enhance SOHO performance while providing 10/100 Mbps flexibility. With 8 ports, the switch can also be deployed for the entry-level workgroup. Powerful yet easy to use, it allows users to simply plug any port to either a 10Mbps or 100Mbps node to multiply bandwidths, boost response time and satisfy heavy load demands.

- Layer 2 switch
- 8 10/100Mbps ports
- Full/Half duplex support for each port
- MDI uplink port for easy expansion
- Palm-sized, Lightweight

(98254)

**\$364**

**USB Ports Available**

<b>DU-A2</b>	PCI Port USB Adapter	(78987) <b>\$48</b>
<b>DU-E10</b>	USB to Ethernet Adapter	(88063) <b>\$115</b>
<b>DU-H4</b>	4 Port USB Hub	(79131) <b>\$75</b>
<b>DU-H3SP</b>	3 Port USB Hub	(78989) <b>\$186</b>

### D-Link DI-701



The D-Link DI-701 residential gateway protects your computers from hackers or unwanted users. It is easiest and safest way to share your high computer internet connection with a DSL Modem or Cable Modem.

(98249)

**\$445**

<b>DI-206</b>	1 ISDN Port, 6 Ethernet LAN Port 2 Analog Ports, IP Routing	(99475) <b>\$625</b>
<b>DI-510</b>	1 x WAN, 1 LAN Port ISIP* Router	(79398) <b>\$379</b>
<b>DI-540</b>	4 x WAN, 1 LAN Port ISIP* Router	(79400) <b>\$990</b>
<b>DI-524</b>	2 x WAN, 5 Port hub	(79399) <b>\$718</b>

\* Internet Server IP

### D-Link DU-560M



The D-Link DU-560M modem provides up to 56kps transmission over the phone line. Small enough to fit in a pocket this modem is the perfect solution for desktop and notebook computers. As a USB device it is also the easiest to install.

(98306)

**\$135**

<b>DFM-560I</b>	Rockwell Internal PCI Bus WIN Data/Fax/VoiceModem	(74361) <b>\$69</b>
<b>DFM-560IS</b>	Rockwell Internal PCI Bus software Data/Fax/VoiceModem	(85106) <b>\$69</b>
<b>DFM-560E</b>	56K High speed Fax Modem	(76739) <b>\$115</b>

**Switches also available**

**Boost response times and bandwidth**

<b>DES-1016</b>	16-port 10/100Mbps Dual Speed. Supports full/half duplex.	(69456) <b>\$1,185</b>
<b>DES-3624 Series</b>	Up to 24 Ports 10/100Mbps. Stack up to 4 switches. Full/Half Duplex	(90759) <b>\$2,399</b>
<b>DES-1024</b>	24 port dual speed 10/100MB Smart rack mount Switch	(76740) <b>\$1,599</b>
<b>DES-3225G</b>	22 + 2 Port 10/100Mbps Dual Speed Gigabit Switch	(90755) <b>\$2,379</b>
<b>DES-1005D</b>	5 Port 10/100Mbps Dual Speed. Supports full/half Duplex	(85101) <b>\$170</b>

### D-Link DFE-905DX

The D-Link DFE-905 is a Dual Speed 5-port dual speed hub that can be configured to either 10Mb or 100Mb speeds. It is designed to offer connectivity in the small home, small office environment. The palm-sized device provides 5 ports to flexibility connect a small workgroup together on an Ethernet or Fast Ethernet network.



<b>DE-809TP</b>	9 Port Mini-Hub 9xUTP with Uplink Capability	(32350) <b>\$154</b>
<b>DE-816TP</b>	16 Port 10MB Hub with 1xAUI/1x BNC Ports (Rackmount)	(51844) <b>\$265</b>
<b>DFE-905</b>	Fast Ethernet Network Kit	(76617) <b>\$289</b>
<b>DFE-908DX</b>	10/100Mbps 8 Port Stackable dual speed hub	(60558) <b>\$324</b>
<b>DFE-916DX</b>	16 Port 10/100Mbps Desktop Hub	(72790) <b>\$633</b>
<b>DFE-2624X</b>	24 Port 10/100Mbps Dual Speed Hub	(98307) <b>\$1,354</b>



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## Camera's, CD-Rom and CD/DVD Tower

### Axis Network Cameras

*If a picture says a thousand words then an Axis network camera can speak volumes.*



**AXIS**  
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#### Axis 200+ Network Camera

The 200+ is a low frame rate network camera that can connect to an Ethernet LAN or dial-up modem telephone line and send a new image at specified intervals via Internet Protocols to your web site, an email box, network server or simply viewed using a web browser. Axis 200+ cameras are in use on ski fields, railway stations, beaches, city views, kindergartens, zoos and more locations than can be listed. Axis 200+ cameras make the associated web sites interesting, up to date and exciting. The 200+ supports a range of third party lenses and provides video control signals to control auto-iris lenses, which are essential on any digital camera that is used outdoors or in bright light.

(47582) **\$1,840**

#### Axis 2100

Like the 200+, the 2100 produces exciting clear images and transmits them over the network. Its state-of-the-art technology and embedded Linux operating system gives it the ability to transmit jpeg images at 10 frames per second. The 2100 is designed for indoor use and features a stylish plastic case and easy setup wizards. As an indoor camera the 2100 dispenses with unnecessary auto-iris video control signals in favour of lower price.

(97648) **\$1,110**

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### PlexWriter 12/4/32

CD-Rewritable SCSI Drive

12X CD-Write, 4X CD-Rewrite, 32X max CD-Read

The PlexWriter 12/4/32 combines Plexor's proven reliability with the most exceptional record, rewrite and playback capabilities available. While achieving CD-Recording at blazing 12X speeds, the PlexWriter 12/4/32 maintains the highest quality and stability while creating a 650MB disc in just 6 minutes. Fast 160ms average random access time and burst transfer rates of 20MB/sec make this drive a top performer. With 32X max read, the PlexWriter 12/4/32 qualifies as a full-time replacement of your existing CD-ROM or CD-R Drive.



(99620) **\$915** Internal

### Optistor CD/DVD Caching Tower

The Optistor CD/DVD caching tower features the Axis CDE100 CD-ROM Server giving support for hard disc caching for up to 100 CD's. Great news for organizations that require fast access to information stored on CDs and DVDs!

The towers are available with 1, 5 or 6 DVD ROM drives and hard drive storage capacity for 25, 50 or 100 full CD's. All towers are fully compatible with NetWare, Windows 95/98 and NT, Mac and TCP/IP, allowing users to access CDs and DVDs simultaneously over the network.

Installation is easy. The Optistor CD/DVD Caching Tower plugs directly into a LAN or WAN via Ethernet or Fast Ethernet in under 5 minutes without bringing down the server network. Add this to the ease of use, fast access to CD's and DVD's and remote administration and you have a complete solution in a box.

5 CD/DVD drive holds 100 discs	99600	<b>\$9,284</b>
6 CD/DVD drive holds 27 discs	99602	<b>\$5,436</b>
6 CD/DVD drive holds 50 discs	99605	<b>\$6,949</b>



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- 13.3" Low-reflection XGA TFT LCD Screen
- Display resolution 1024 x 768 up to 16 Million Colours
- 16-Bit stereo soundcard & one speaker
- Includes PCMCIA 56K fax modem
- NeoMagic NM2380 (including 6.0MBVideo RAM)
- Type II slot x 1, cardbus support
- Li-ion Battery pack (1.8 hours)

(xxxxx) **\$5,695**

### LL-T155A



- Screen size 15-inch (diagonal 38cm), resolution XGA (max 1024 x 768 dots)
- High- Resolution (200 cd/m<sup>2</sup>, 300:1) TFT LCD for superb image quality, up to 16 million colours
- Auto balance (automatic colour level adjustment)
- Automatic pixel converter (VGA/SVGA)
- Long-lasting backlights- up to 50,000 hours
- Power management function- max 22W during operation, down to 5W during power safe mode
- Plug and play compatible- Win 95/98
- USB for easy connection to various peripheral devices
- Uses one-fourth the space of a CRT monitor
- User- friendly design with reduced flicker is easier on the eyes.

(xxxxx) **\$2,295**

### XG-NV7XE



#### Ultra Compact & Lightweight

- Ultra Compact and Lightweight Design with Newly Developed Magnesium Alloy Cabinet and DLP™ Engine
- Digital Input
- DVD compatible (via 15-pin mini D-sub)
- 800 ANSI Lumen brightness
- True XGA (1024 dot x 768 line high-resolution images), SVGA, VGA and Mac (19"/16"/13") compatible for direct PC connection (plug & play)
- UXGA (1600 dots x 1200 lines), SXGA (1280 dots x 1024 lines), high resolution images compatible in advanced intelligent compression system (AICS)
- Network ready: IrDA Transmission (IrCOM)
- Auto response adjustment
- Graphical user interface.

(87611) **\$13,995**

### XG-NV21SE



#### Super Bright 1400 ANSI Limen

- True SVGA (804 dot x 604 line high resolution images), VGA and Mac (16"/13") compatible for direct PC connection
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(96023) **\$9,900**

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(92726) **\$1,995**

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for desktops or  
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(85980)  
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### Optra T610

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or small  
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with Moderate  
print volumes



(85982)  
**\$1,829**

### Optra T612

A versatile and  
fast workgroup  
laser printer  
delivering  
exceptional  
value



(85983)  
**\$2,198**

### Z11 Color Jetprinter

Print photos, cards, and  
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price. (1200x1200 dpi/  
4ppm black/2.5ppm  
color)



(91535)  
**\$149**

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price.



(74464)  
**\$234**

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home.



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APC Back-UPS Pro 280si (76636) **\$290**  
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## APC Surge Arrest

## PNote Pro®



Back-Ups for PC's!

300va (56229) **\$210**  
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SurgeArrest 5 Strip

(99591)

**\$60**



The SurgeArrest Notebook Pro Surge Protector provides the mobile notebook professional with advanced AC and telephone line protection. The unique, in-line design creates a compact, lightweight surge protector that is truly portable and appropriate for use in any country throughout the world. With built-in Excess Current Detection, the Notebook Pro warns you against potential modem damage. A Velcro mounting strap and 6 ft. telephone cord eliminate the need to carry any additional accessories.

PNote Pro

(99592)

**\$67**

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New! Smart-UPS 700, 1000, and 1400 2U Rack Mounts



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## 107P10 17" Real Flat Monitor

(96590)

pc world

**\$899**

NEW!  
PRODUCT

Plug  
Play

- **Award Winner!** Review from PC World April 2000 edition.
- The 17-inch (16.0" VIS) Brilliance 107P Real Flat monitor with a 0.25 mm Aperture Grille tube has a maximum horizontal frequency of 96 kHz.
- Maximum resolution of 1920x1440 with flicker free display of 1024 x 768 at up to 120 Hz.
- Dual inputs allows the simultaneous connection to two computers while CustoMax™ offers outstanding ease of use.
- Optional USB hub offers flexibility and freedom of choice.



## 109P10 19" Real Flat Monitor

(96591)

**\$1,219**

USB

- The 19-inch (18.0" VIS) Brilliance 109P Real Flat monitor is designed for demanding professional users.
- 0.25 mm Aperture Grille tube- has a maximum horizontal frequency of 110 kHz, offering a maximum resolution of 1920 x 1440 with flicker free display of 1280 x 1024 at up to 103 Hz
- An exclusive Auto Calibrate feature is included that guarantees consistent performance and extends the useful life of the monitor by one third.
- CustoMax™ software & optional USB hub delivers flexibility and freedom of choice.



## 201P10 21" Real Flat Monitor

(45876)

**\$2,124**

USB

- The 21-inch (20.0" VIS) Brilliance 201P Real Flat monitor is designed for demanding professional users who require a large screen size.
- 0.24 mm Aperture Grille tube- has a staggering maximum horizontal frequency of 121 kHz, offering a maximum resolution of 2048 x 1536 with flicker free display of 1600 x 1200 at up to 97 Hz.
- An exclusive Auto Calibrate feature is included that guarantees consistent performance and extends the useful life of the monitor by one third.
- CustoMax™ software & optional USB hub.



## 150P 15.1" LCD XGA Monitor

(96592)

**\$2,270**

PC  
Authority  
RECOMMENDS

NEW!  
PRODUCT

USB

- **Award Winner!** Review from PC Authority April 2000 edition.
- "This was one of the top five in terms of quality and it exhibited no serious deficiencies. When discussing a 'complete' product, this is it, since it provides everything you could need in a TFT screen at a very reasonable price. Compatible with PC & Mac system and is ready for the upcoming DVI-D digital display. For multimedia users, the 150P features 2 x 1W stereo speakers, as well as a centrally-located microphone."

PC Authority: April 2000 edition.



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## Brand new state-of-the-art Monitors

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DDS-4 4mm  
150m 20GB

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(88711)



DDS-3 4mm  
125m 12GB

**\$40**

(66576)



DDS-2 4mm  
120m 4GB

**\$25**

(13262)



DDS-1 4mm  
90m 2GB

**\$11**

(06103)



10 x CDR

(unbranded) 74min

**\$27**

(97902)



4x CDRW

(preformatted)

74 min

**\$11**

(91467)

### Sony SDMN50 Colour Monitor



The SDMN50 is ultra-thin, bold, and breathtakingly precise. The Sony Flat Panel Display delivers in places where the others can't. Provides cutting-edge performance and technology in a breakthrough space-saving design • 15" XGA TFT Active Matrix LCD Panel • low profile, easy-tilt design, black matte finish • separate ultra-thin screen and media box. (97422)

**\$2,998**

### Sony CPDE200 17" FD Trinitron



Sony offers outstanding image quality with reduced glare and no picture distortion by utilising the latest unique Trinitron innovation - the FD Trinitron Multiscan CRT • 17" (16" viewable) • .24 - .25 aperture grille • high contrast anti-reflective coating • 1280 x 1024 @ 75Hz maximum resolution.

Sony's 3 Year On-Site Warranty  
\*Conditions Apply

(84022) **\$799**

### Sony Digital Mavica MVCFD90 Floppy Disk Digital Camera



Removable 3.5" 2HD floppy disk storage media • 1.3 mega pixel CCD interface • SXGA (1280x960), XGA (1024x768), VGA (640x480 pixel) resolution • Up to 30 images per 1.44MB floppy disc/1,272 per 64MB memory stick with optional MSACFD2M adaptor • 2.5" colour LCD • 560g • Voice Memo mode (up to 40 secs).



(SRP)

**\$1949**

Ask about other Sony Mavica models!!

### CRX140EBK CD-R/RW kit 8x write, 4x rewrite, 32x read



This IDE interface drive ships complete with everything you need to get started. Includes interface and audio cables, mounting screws, Adaptec CD Creator & CD Direct Software installation and user manuals PLUS one CD-R and one CD-RW disk.

(98876) **\$549**

**NEW 10x  
Recording!**



(97411)

### CD-RW Drive CRX145SBK MAX Performance CD-RW Kit

The CRX145 offers MAXimum performance with the latest 10X recording technology, 32X playback and 4X RW. This high performance drive features SCSI interfacing and custom Sony Laser technology. A large 4MB buffer and special 4X audio mode combine for accelerated recording and anti-skip playback. Supplied as a kit with everything\* required for installation & operation including cables, media, Adaptec CD Creator V4 & DirectCD V3 s/w. New Preformatted media saves up to an hour in set up time.

\* SCSI Host Adapter card not included.

**Preformatted Software**

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(97409) **\$639**







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## Open File Manager



(97770)  
**\$920**

Your back up systems play a critical role in your company's operation. Unfortunately there is a gap in every NT and Netware backup program. Most backup programs don't even attempt to include open email, databases, web server or other files. That's where St. Bernard Software's Open File Manager comes in. It is the only utility that allows all major backup programs to consistently capture the mission critical open files at any time. Open File Manager (OFM) ensures a complete and accurate backup, reliably and easily, even if the files are in use.

## Backup Software - TapeWare



**TapeWare  
Lite: Single  
Server backup  
for NT,  
Netware or  
Linux**  
(97849)  
**\$425**

TapeWare - Loaded with features yet simple to use. TapeWare is simple to install and easy to administer whether you have a single PC or a large enterprise network.

- Quick Start Wizards set up most common applications quickly
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External (91110)  
**\$1,948**  
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(91106)  
**\$1,840**

- 33 GB Native, 66GB compressed
- 3-6MB sec sustained, that's 21.6GB/Hour
- SCSI-2 and LVD models available.
- Variable speed operation matches data throughput to your computer
- Packet based technology guarantees reliable restores
- LINUX approved
- Variety of case colours (\*White, black, red, translucent)
- Compatible with most backup software



## Benchmark DLT Tape Drive



Internal (88037) **\$3,449**  
External (88038) **\$3,699**

- 40GB native, 80GB compressed
- 3-6MB sec sustained, that's 21.6GB/Hour
- Ultra Wide SCSI LVD interface
- Reads DLT4000 tapes (20/40Gb Only)
- Internal or External models
- LINUX Approved
- 7 tape autoloader available
- Compatible with most common backup software
- Standard DLT form factor

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(xxxxx) **\$469**



The right tool for e-commerce site developers - a must if you create shops for others. Point-and-click ease and HTML code access give you full control over site design.

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Offers a variety of license packages to best meet your needs

WebSpy Reporter v2.0  
Unlimited User Single Installation RRP \$599.00

WebSpy Professional v3.0

Up to 15 users	(99736)	<b>\$499</b>
Up to 25 users	(99737)	<b>\$799</b>
Up to 50 user	(99738)	<b>\$999</b>
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## Simplicity 56K V.90 Data Voice Fax Modem

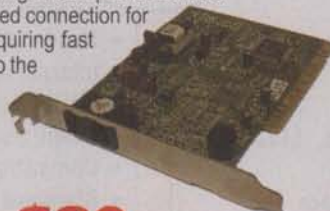


At 56Kbps, NetComm Simplicity Modem delivers everything you need in terms of speed, flexibility and connectivity to stay in-touch on the net instantly. Plus with Flash ROM upgradeable to the latest communications standard, you are assured true value for money now and also in the future.

(99745) **\$149**

## InModem56

This Internal PCI Modem is simply a plug and play solution for all users requiring user-friendly installation. Simply plug InModem56 into your PC and be up on-line in minutes. In addition NetComm InModem56, a data, fax and voice internal modem running at 56Kbps also delivers high-speed connection for users requiring fast access to the internet.



(99746) **\$80**

## TruConnect Combo PC Card

A most convenient integrated 10/100 Fast Ethernet & 56K modem PC Card with built-in connectors - that's NetComm's latest release, TruConnect Combo PC Card. With no dongles, this PC Card uses industry standard connectors and it's truly a cost-effective, practical solution for mobile users to connect to a LAN and to the internet Simultaneously.



(99747) **\$429**

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## 56K Modems/FREE Internet Access

### Dynalink 56K Voice/Fax/ Data Speakerphone Modem

"Good value for money... ease of setup and use is excellent... consistently connects at high speeds."  
PC World Nov 99



**5 Year  
Warranty**

(54361)

**\$135**

- V.90 / K56flex dual-mode for high Internet compatibility
- Plug and play, plus friendly QuickGuide for easy installation
- Send and receive faxes from your PC
- Supports FaxStream DUET, Caller ID, Speakerphone Mode and VoiceMail

### Dynalink V.90/56K ISA or PCI Card Modem

**5 Year  
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on ISA**



ISA: All the features of the External. Manually configurable Jumper Settings. PCI: Plug and Play Installation - V.90/K56flex dual mode for high Internet compatibility - Telephone answering machine mode - Send and receive faxes from your PC.

ISA: (77577)

**\$129**

PCI: (72909)

**\$84**

### DYNALINK USB MODEM

- \* Super-easy Installation.
- \* Free up Slots and IRQs.
- \* No Power Supply, No Messy Cables.
- \* Dual-mode V.90, Fax Machine, Answer Machine.



(90116)

**\$169**

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Warranty**

### MagicXpress TView Video Capture Card

"One of the two best cards in terms of picture quality" APC, July 9. Watch TV on your computer monitor and capture incoming video (e.g. from CamCorder). Fully featured, including Teletext and remote control. Resizable window, right up to full-screen (640x480).



(72860) Standard

**\$130**

(78482) With FM tuner

**\$135**

For more info on any of Dynalink's products, please visit [www.dynalink.com.au](http://www.dynalink.com.au)

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## Manage your Desktop Efficiently

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### Diskeeper V5.0



Diskeeper solves the issue of degraded performance on your NT Servers and Workstations by optimising the disk file accessing mechanism.

File fragmentation

first strikes during the process of installing Windows NT and continues to spread, worsening system performance each time files are created, edited, compressed or uncompressed. The resulting increase in disk head seek times required to retrieve these file fragments can bring a busy system to a standstill. With Diskeeper, software loading times and database search times can be significantly reduced. Performance is increased for Internet servers, e-mail servers, graphics and financial applications, Multimedia and video applications.

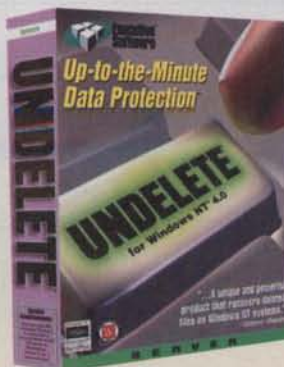
Diskeeper V5.0 Server

(82944) **\$489**

Diskeeper V5.0 Workstation

(82953) **\$99**

### Undelete



Accidentally deleted files are a fact of computing life. When accidentally deleted files are not in the Recycle Bin, it makes lots of extra work for system administrators. The usual solution is to search through backup tapes until they find the lost file. This often consumes hours. Most businesses run backup at night, so work done after the latest backup is often lost and

needs to be recreated. More wasted time and

lost productivity. Undelete is a complete solution for Windows NT Servers and Workstations giving a Network Administrator the ability to instantly restore deleted files. As you will see, Executive Software Undelete provides a complete, real world solution to these every day problems.

Undelete V2.0 Server (pic)

(80392) **\$490**

Undelete V2.0 Workstation

(80390) **\$108**

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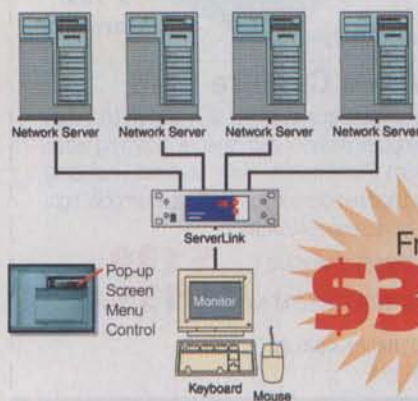
## Multi-Server Controllers

**Control up to 256 network servers with a single monitor, keyboard & mouse**

**3 Year Warranty**

With a ServerLink KVM switch you can monitor and fully control up to 256 network servers with just one monitor, keyboard and mouse. Save money on expensive monitors, create more working space and cut down on your power costs.

Designed and manufactured in Australia by an award winning engineering company, ServerLink is packed with features, providing total control of your ever expanding network.



From **\$375**

- Select servers via On-Screen-Display or Front Panel
- Name servers for simple selection
- Mouse & keyboard emulation for flawless booting
- Scan Mode for periodic server monitoring
- Standard cables used throughout
- Cascadeable to control up to 256 servers
- 8 and 16 port models 19 inch rack mounted design
- Australian designed and manufactured

# ServerLink™

- EPROM upgradeable for future technology
- Supports PS/2 and Serial mouse emulation

<b>SL-401E</b>	4 Port ServerLink Controller for PS/2 only	(71652) <b>\$375</b>
<b>SL-401</b>	4 Port ServerLink Controller	(63724) <b>\$795</b>
<b>SL-801</b>	8 Port ServerLink Controller	(63777) <b>\$1345</b>
<b>SL-1601</b>	16 Port ServerLink Controller	(63778) <b>\$2190</b>



# SERVERLINK INFINITY

**PS-2 ONLY**

- Flash ROM upgradeable for future technology
- Password protection for security

<b>SL-821</b>	8 Port ServerLink Infinity controller	(97888) <b>\$1170</b>
<b>SL-821-P</b>	8 Port ServerLink Infinity controller includes 8x2 metre Cables	(97889) <b>\$1335</b>
<b>SL-1621</b>	16 Port ServerLink Infinity controller	(97890) <b>\$1929</b>
<b>SL-1621-P</b>	16 Port ServerLink Infinity controller includes 16x2 metre Cables	(97891) <b>\$2285</b>



**NEW SERIES**

**ServerLink to computer cable**

Each end of the cable fans out into three connectors.

2m cable for PS/2 mouse, keyboard and monitor (63972)

**\$29**

5m cable (63976)

**\$79**

2m cable for AT/Serial mouse, keyboard and monitor (63974)

**\$29**

5m cable (63977)

**\$79**



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# Smart Storage Solutions

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## Zip 250MB USB



Provides high-capacity storage in an easy-to-use format that can go from desktop to laptop quickly and reliably. Sleek new design. Connect via USB port or through PCMCIA card version which requires no additional power cables. Backward compatible with 100MB Zip media

**\*\$319**

Drive USB/PC Card Combo:  
(82780) **\*\$452**

\*Collect 1000 Bonus Fly Buys points when you purchase these products (74450,74451,82633 or 82780)

## ZIP

### Zip 250MB

Portable, light, easy to use and holds more files than ever before! Backwards compatible with 100MB Zip disks. Comes with 1 Zip 250MB disk. Iomega tools supplied on CD.

Parallel (74450) **\*\$338**

SCSI (74451) **\*\$289**

Disks:

Single (74454) **\$35**

10-pack (74452) **\$315**

## pc world best buys

"Best Buy for Removable storage under 1GB goes to Iomega ZipCD 650 for its purchase price and great software bundle and, of course the low cost of CD media"

April 2000  
PC World Magazine



Collect 1000 bonus Fly Buys points when you purchase the marked products between 20/05/00 - 30/06/00

### Zip 100MB disk:

(23772) **\$19**

10-pack:

(21889) **\$203**

### Zip PCMCIA SCSI accelerator card

(35145) **\$175**

### Zip ISA SCSI Zoom accelerator card

(21888) **\$59**

### Zip drive carry case

(31823) **\$50**

### Zip parallel cable

(46305) **\$41**

### Zip SCSI cable

(46304) **\$38**

### Zip disk labels 20-pack (48059)

**\$3**

### Zip 6-disk wallet

(35146) **\$25**

### Jaz 1GB disk

(24218) **\$170**

3-pack

(32844) **\$465**

### Jaz PCMCIA SCSI card

(44744) **\$230**

### Jaz universal power supply

(35154) **\$53**

### Clik! Power Supply

(78925) **\$29**

## JAZ

### Jaz 2GB External



**\$639**

(78941)

The external Jaz 2GB drive is faster than many hard drives, has a full 2GB of storage space in each removable disk, gives you the freedom to take your files with you, and is backward compatible with industry standard Jaz 1GB disks. Does not include Jaz disk.

Disk single (61652) **\$180**

Disks 3-pack (57271) **\$604**

## CLIK!

### Clik! PC Card Drive



Integrated, high-capacity removable solution for notebook users. Sleek & compact, fits into most notebooks. Store, protect and share important information on a 40MB Clik! disk (not included).

Clik! Drive Bundle (75501) **\$230**

Clik! Drive PC Card (78902) **\$283**

Clik! Drive Mobile (76743) **\$310**

Clik! disks 2-pack (75984) **\$62**

Clik! disks 10-pack (75985) **\$160**

## ZIPCD

### 4x 4x 6x External



The ZipCD\* external Universal Serial Bus (USB) CD-ReWritable (CD-RW) drive enables you to record, create, share and archive up to 650Mb of data on a common CD format. Iomega's ZipCD drives are high-capacity, easy-to-use and ideal for saving and sharing original music, personal photos, games, internet content and more. The ZipCD\* 4x4x6 external USB drive offers an innovative external design and complements Iomega's ZipCD 4x4x24 internal drive providing you with a choice of optical storage methods

**\$545**

(92623)

See [www.ht.com.au/cat/iomega](http://www.ht.com.au/cat/iomega) for more info on these products

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## Tomorrow's Performance Today

SHINTARO

### 10x CD-RW

Powered by Sony's high-performance 32X-R x 10X-W x 4X-RW IDE CD recorder, the Shintaro CDRW100 will record a full CD in under 8 minutes! Supplied with Adaptec Easy CD Creator software and 12 blank Cd's, the CDRW100 offers a complete CD production kit with the power to burn!

COMPACT  
disc  
Recordable  
ReWritable



Record a full CD in under 8 minutes!  
Includes Adaptec Easy CD Creator  
ReWrite CD-RW 1000+ times  
Supports 80min/700Mb CD's  
32R x 10W x 4RW Performance

(99695)

**\$679**

### 16x DVD

Delivering blistering 16X DVD performance, the Shintaro DVD1600 player kit combines dedicated hardware MPEG-II video decoding with the industry leading DVD-ROM drive from Pioneer. The result - A DVD movie player for your PC which also plugs straight into your TV, plus a computer DVD-ROM reader so fast that your PC will be begging for mercy!

DVD  
ROM



16X Pioneer DVD Technology  
Hardware MPEG-II Playback  
TV Output  
Dolby Digital AC-3 Output  
Includes Websters 2000 Encyclopedia

(99694)

**\$490**

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## Specialists in Sound and Storage

### YAMAHA CDR SOLUTIONS

**NEW**



#### YAMAHA CRW8824 Series

Yamaha leads the way again with the new 8X re-writeable format, just established. As well as CDR writing of a full disc in around 9 minutes, you can re-write at 8X as well, when using the new 8X rewriteable discs. Other improvements include 24X Digital Audio Extraction for fast audio disc compilations, a newly designed optical pickup and support of CD-Text. Improved packet written disc reading performance makes CDR reading and writing faster and easier than ever.

**(8)(8)(24)**  
WRITE REWRITE READ

- 4 Mb Buffer
- New optical pickup design
- 24X audio extraction
- A full disc, on a CDR or an 8X CD-RW disc, in around 9 minutes!!

• AVAILABLE IN E-IDE KIT, SCSI INTERNAL AND EXTERNAL KITS, AND THE **NEW IEEE-1394 KIT!!!**  
**CALL FOR PRICING!!**

(xxxxx)

**\$Call**

**CRW8424EVK** - E-IDE kit, complete with Adaptec Easy CD Creator, Direct CD V3.0, Take Two backup software, power cable, screws, manual, Australian Warranty.

(90113) **\$525**

**CRW8424SVK** - SCSI Internal Kit, with Adaptec Easy CD Creator, Direct CD V3.0, Take Two backup software, power cable, screws, manual, Australian Warranty. No SCSI Card Incl.

(90112) **\$560**

**CRW8424SXVK** - SCSI External Kit, with Adaptec Easy CD Creator, Direct CD V3.0, Toast for Mac V3.5, Take Two software, power cable, manual, Australian Warranty. No SCSI Card or Cable.

(90114) **\$725**

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### YAMAHA SPEAKERS



#### YSTM40

2x12 W speakers - a quality desktop pair. Dual analogue inputs. Advanced Servo Technology, for deeper bass.

(99555) White  
**\$115**

#### YSTMS30

3-piece Powered Multimedia speakers/sub-woofer with 30 watts of power and magnetic shielding to eliminate monitor distortion.

(86029) White  
**\$139**

#### YSTMS55D

Satellite/Sub "Killer" system, with 80 watts RMS. 20W and 20W (left and right) and 40W SubWoofer. 2 Analogue and 1 USB input.

(81345) White  
**\$274**

Yamaha audio quality makes such a difference to your desktop!



Model:	YSTM8	YSTMS30	YSTMS35D	YSTM40	YSTMS55D	YSTMSW8	YSTMSW10
Description:	Full range powered monitor speaker pair	3-piece powered speakers & sub-woofer system	3-piece powered speakers & sub-woofer system	Quality desktop pair.	3-piece powered speakers & sub-woofer system	Powered subwoofer	Powered subwoofer wooden cabinet
Watts:	2x 5w	2x 6w speakers, 18w subwoofer	2x 6w speakers, 18w subwoofer	2x 12w speakers	80w speakers, 40w subwoofer	15w	25w
Features:	Ashtonishly deep bass. Subwoofer and headphone output jacks. Dual stereo inputs.	2" Satellite speakers for brilliant highs. Deep, powerful bass to 45Hz.	USB architecture for superior sound and easy Plug and Play installation.	Dual analogue inputs. Advanced servo Technology for deeper bass.	USB. Deep, powerful bass, brilliant highs. Headphone output jack.	Deep bass. Subwoofer and headphone output jacks. Dual stereo inputs.	Incredible audio depth, auto on/off Chest-thumping bass response down to 35Hz.
White:	(81339) <b>\$80</b>	(86029) <b>\$139</b>	(86031) <b>\$172</b>	(99555) <b>\$115</b>	(81345) <b>\$274</b>	(81348) <b>\$106</b>	(81350) <b>\$172</b>
Black:	(81340) <b>\$80</b>	(86030) <b>\$139</b>	(86032) <b>\$172</b>	(99556) <b>\$115</b>	(81346) <b>\$274</b>	(81349) <b>\$106</b>	

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## Stunning Performance...

# AT BREAKTHROUGH SPEEDS

Tektronix  
Phaser 850  
Colourstix  
with Free  
Black

**Cyan**

(92500)

**\$179**

**Magenta**

(92501)

**\$179**

**Yellow**

(92502)

**\$179**

The Tektronix Phaser 850 is nothing less than an exceptional, network-ready, powerhouse colour printer. It's in a class of its own. Extremely easy to use, it also boasts surprisingly flexible paper handling and automatic two-sided printing.



### BREAKTHROUGH SPEEDS

- up to 14 pages per minute

### UNBEATABLE POWER

- 200MHz processor

### DAZZLING COLOUR

- up to 1200 dpi and ColorSync savvy, Adobe PostScript 3

### FREE BLACK INK

- means low cost per print

### ON-BOARD NETWORKING

- 10/100BaseT Ethernet or native USB



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**A3** colour  
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more details

Model <b>Tektronix</b>	850/N	850/DP	850/DX
Resolution	800 dpi	1200 dpi	1200 dpi
Memory Standard/Max	32 MB (256 MB)	64 MB (256 MB)	128 MB (256 MB)
Built-in Hard Disk	Optional	Optional	6 GB Hard Disk
RISC PowerPC Image Processor	200 MHz	200 MHz	200 MHz
Max. Speed Fast Colour	14 ppm	14 ppm	14 ppm
Max. Speed Standard	8 ppm	8 ppm	8 ppm
Max. Speed Enhanced	4 ppm	4 ppm	4 ppm
Max. Speed High Resolution/Photo	2 ppm	2 ppm	2 ppm
Pipeline Printing	Optional	Standard	Standard
Job Accounting	50 Jobs	500 Jobs	5,000 Jobs
Collation Printing	Optional	Yes	Yes
Duplex Built-in Automatic	Optional	Standard	Standard
Main Paper Tray 200-sheet	Standard	Standard	Standard
Hi-capacity Tray 500-sheet each (two)	Optional	Standard (one)	Standard (one)
Prt number	(90162)	(90163)	(90164)
Price	<b>\$5,729</b>	<b>\$7,397</b>	<b>\$9,570</b>

\*Requires optional hard disk drive.

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### A4 BJC-3000

(94499)

**\$269**

- Up to 9ppm print speed black
- 1440 dpi
- Separate replacement colours

### A3 BJC- 6500

(95962)

**\$679**

### LBP1000

10 pages per minute print engine at 1200 dpi resolution. Energy saving 'On-Demand' toner fusing. Cost-saving 'economy' printing mode. Powerful processor to ensure maximum throughput. Memory Saving Technology to accomplish more in less RAM. PCL6 Print Language emulation. Optional genuine Adobe® PostScript® 3™ printer language. Optional second 250 sheet paper feeder. Maintenance free 'all-in-one' toner and drum cartridge. 4 MB RAM standard - upgradeable to 36 MB.

(95983)

**\$1,259**

### BJC-265SP

Super Economy mode: cartridges deliver up to 400 pages in colour, 2400 in black. Up to 4ppm in black, up to 0.3ppm colour. Banner printing capable.

(76009)

**\$139**

### BJC-2000SP

Super Economy mode: 3,600 black text pages. Prints up to 5 ppm for black text and up to 2ppm for colour. Photo mode on plain paper. Optional PhotoRealism photo printing. Banner printing capable. Optional colour scanner head.

(80926)

**\$169**

### BJC-8200

Photographic printing quality 1200 x 1200 dpi. PhotoRealism 6 colour printing. Separate ink tanks for each colour with level detection system. Optional scanning at 600 dpi. Parallel connectivity for Win® 95/98 & NT 4.0 USB connectivity for pre-installed Windows.

**NEW!!**

(95964)

**\$679**

### LBP800

Desktop laser, 8ppm, 300x300dpi, 600x600dpi and 2,400dpi with text and line smoothing. 512K buffer. 2,500 pages per cartridge (5% cover). Win® 95, 98 and NT 4.0.

(83787)

**\$549**

**Most compact, lightweight flatbed scanners available!**



- Silent & fast scanning
- Super slim & compact
- Plug & Play

- 36-bit
- Fully integrated software package

#### FB-330P

300x600dpi.  
(83661)

**\$135**

#### FB-630P

600x1200dpi.  
(83673)

**\$189**

#### FB-630U

600 x 1200dpi  
opt. res. (83685)

**\$219**

### C70

All-in-one total colour solution. Colour fax to colour fax (no PC), high quality Bubble Jet™ Printer, stand alone colour copier, scanner, PC fax and handset. Fully-featured plain paper fax with 12 one-touch, 100 coded speed dials, 42 page memory, 6 seconds per page transmission, dual access and Telstra FaxStream® Duet compatible. High definition, 720 x 360 dpi colour Bubble Jet Printer with optional PhotoRealism™ Technology for superior photographic reproduction.

(99190)

**\$720**

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## Printers that mean business

# Sharp colour...

# Sharper prices...

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16ppm  
mono

4 ppm  
colour

Standard  
Ethernet

**MagiColor 2  
DeskLaser**

**\$400  
Software Upgrade  
FREE- Buy Now!**

Why pay more than you have to when QMS  
gives you desktop colour laser printing  
from only **\$2,990** (83652)

### Fly Buys.

Collect Fly Buys points on your Computer Hardware & Software when you Purchase from Harris Technology.

Turn your colour laser into a colour photocopier for only **\$875** with the QMS ScanCopier 200 digital copier/scanner



Colour copying capability can be added to the QMS MagiColor 2 DeskLaser printers with the QMS ScanCopier 200, giving users

a very flexible product for printing and copying, in colour, at a very affordable price. Its control panel has the familiar look of a normal photocopier and copying is performed at the touch of a single button. The QMS ScanCopier 200's flatbed scanner can be simultaneously connected to a PC, enabling it to operate as a full function digital scanner as well as a digital copier.

**\$875**

(83589)



24ppm  
mono

6ppm  
colour

Standard  
Ethernet  
Auto  
Duplex  
Option

Oversize  
A3

**6100 A3  
Laser Printer**

(99572)

**\$8,980**

### Why QMS?

The Magicolor range from QMS comprises nine different models incorporating features such as oversized-A3, PostScript, and auto duplexing. Within the Magicolor range there is a printer available to suit your individual needs. The outstanding advantage is that you don't need to pay thousands of dollars for costly add-ons that you don't require. The Magicolor 2 DeskLaser range utilises the power of Windows to produce 16 pages per minute in monochrome and 4 pages per minute in colour, prints at 600 x 600 dpi, has 24MB RAM, ships with ethernet as standard and has the option to automatically duplex. These printers are an ideal investment for emergency/short run brochures, sales proposals, presentation, company reports, letters, etc.

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# Making images work for you


**NEW**

## ePhoto CL18

Dual Mode: (point-and-shoot digital camera with video conferencing, video clipping and video e-mailing features), VGA (640 x 480 pixels) optical resolution with CMOS sensor, 32 images on internal 2Mb memory (non removable), Optical viewfinder, Built-in Flash, ISO 200, Includes camera cradle for video conferencing, USB interface. Excellent s/w bundle (Twain driver, Corel PrintHouse, Corel PhotoHouse, Microsoft NetMeeting, ArcSoft VideoImpression)

(99757) **\$360**

Product expected early June


**NEW**

## SnapScan e50

1200 x 2400 optical resolution (9600 maximum), 42 Bit, USB interface, Integrated TPO for transparency and negative scanning, 4 front panel buttons (programmable), 3 interchangeable coloured handles and button covers. Agfa ScanWise and comprehensive software package including Corel Print Office 200 and ReadIris

**USB**  
(99759)

**\$419**

Product expected early June

## ePhoto CL30 Klik!

The fantastic ePhoto CL30 now available with built-in Iomega Klik! Drive. Mega-pixel digital camera with USB interface and a resolution of 1440x1080 pixels. Features an optical viewfinder and 1.8" colour LCD screen. Auto focus lens with 2x digital zoom and macro function.


**USB**  
(89409)

**\$1,218**

**USB**

White (74496)

**\$249**

## SnapScan 1212u

One pass, high quality 600x1200ppi scanner (9600ppi max.) with USB interface. Includes Caere Omnipage LE OCR, Caere PageKeeper, Corel Print-House Magic Select & Agfa's incredible ScanWise software. Win98 compatible.

"Best Scanner 1999" - PC World magazine

## SnapScan Touch

Agfa's revolutionary Snap-Scan Touch USB Scanner has four programmable buttons: scan direct to file, email, fax or printer. 600x 1200 ppi, 36 bit, landscape desktop scanner. Comes with 7 translucent coloured handles! Software: Agfa ScanWise, Caere Omni-Page LE OCR, & more.


**USB**

(87209)

**\$269**

**USB**

(74495)

**\$175**

## SnapScan 1212p

One pass, high quality 600x1200ppi scanner (9600ppi max.) with parallel interface. Includes Caere Omnipage LE OCR, Caere PageKeeper, Corel Print-House Magic Select & Agfa's incredible ScanWise software. Compatible with Win95/98/NT.

## SnapScan 1236u

One pass, high quality 600x1200ppi scanner (9600ppi max.) with USB interface. 36 bit colour. Comes bundled with Caere OmniPage LE OCR, Caere PageKeeper, Corel Print-House Magic Select & Agfa's incredible ScanWise software. Win98 compatible. ADF & TPO available.


**USB**

(84306)

**\$359**

## More from Agfa...


DuoScan HiD  
(92981)  
**\$4,315**

Transparency adapter for SnapScan 1236. Moving light source. 203x254mm. (76779) **\$325**

Document Feeder for DuoScan T1200. (75581) **\$455**

Batch Slide holder set for DuoScan T1200. (75582) **\$238**



DuoScan T1200 SCSI-2. 36 bit. Transparency scanning. Opt. res. 600x1200ppi (74498) **\$1,315**



DuoScan T2500 SCSI-2. 36 bit. Transparency scanning. True opt. res. 1250ppi (74499) **\$8,185**

See Web Direct Link for pricing on other Agfa products.

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# matrox

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## Dramatically Different Graphics

### Matrox Millennium G400 Dual Head Graphics Acceleration Card



Armed with the industry's fastest graphics chip, the Millennium G400 Series takes explosive acceleration two steps further by adding unprecedented image quality, along with the most versatile display options for all your 3D, 2D and DVD applications. It delivers superb games performance as well as the speed, image quality and multimedia ability. The MAX version in the series offers even faster performance and a 360 Mhz DAC for ultra crisp display at high resolutions.

- Environment mapped bump mapping - a sensational 3D feature. Only card to support this!
- DualHead models run 2 monitors from the one G400 card
- Amazing! Many interesting uses. (see left) Look at [www.matrox.com/g400/applications/dual/home.htm](http://www.matrox.com/g400/applications/dual/home.htm) for more information.
- Stunning on-screen visual quality
- Explosive 3D, 2D and DVD performance
- Superior DVD and TV output
- Upgradable to video capture & video editing (TV, VCR, PC output)

### Supports a 2<sup>nd</sup> display!

(monitor or TV)



- Extend applications and tool bars across two displays
- Display DVD video full-screen out to TV
- Retouch an image by zooming it to full-screen
- Play a 3D game on a big screen TV

G400 16MB RAM

(78105)

**\$359**

G400 32MB RAM

(78103)

**\$449**

G400 MAX 32MB RAM

(78106)

**\$479**

#### HP Mega CASH BACK

\*From April 14th to June 30th. Conditions apply see claim form for details

#### \$50 CASH BACK

HP OfficeJets T45 (84356)

HP OfficeJets T65 (84893)

HP OfficeJets R45 (80302)

HP OfficeJets R65 (80322)

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HP OfficeJets 635 (55544)

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### HP OfficeJet G55 All Colour: Printer, Copier, Scanner

Provides the best quality colour printing, copying and scanner in a compact space saving unit. Ideal for the person who wants the best.



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(xxxxx)  
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(xxxxx)  
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The OfficeJet G95 provides the highest quality printer/copier/scanner and standalone fax to network into your office workgroup environment. The OfficeJet G95 also comes standard with a duplexing unit.



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## HP ScanJets

### HP ScanJet 5200C

Highest productivity for business

- Get your complete scan job done up to 3 times faster
- Internet ready files automatically
- Complete software solutions for businesses
- Easy setup through USB or parallel



**CASH BACK**  
**\$50**

(74118)

**\$369**

### HP ScanJet 5300C

Turn the Desktop into an imaging and document centre!

- 1200dpi optical, 9600dpi enhanced
- HP Intelligent scanning technology to deliver consistently superior results
- Worry-free USB connectivity. Also has parallel connectivity.



**CASH BACK**  
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(93770)

**\$530**

### HP ScanJet 6300C

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- 36 bit colour
- 5 front panel buttons
- 35mm Slide Adapter.



**CASH BACK**  
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(81726)

**\$725**

### HP Mega CASH BACK

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HP ScanJet 6390C (83227)

### \$50 CASH BACK

HP DeskJets 950C (97337)

HP DeskJets 1120C (56298)

HP ScanJets 6350C (81727)

### \$25 CASH BACK

HP DeskJets 610C (80426)

HP DeskJets 810C (77961)

HP DeskJets 880C (72920)

HP ScanJets 3300C (81725)

HP ScanJets 4100C (xxxxx)

## HP DeskJets

### HP DeskJet 930C

Compact Photo- Quality Colour InkJet Printer

- Alternative 2400x1200dpi mode on photo paper with HP PhotoREt 3
- Excellent results on all types of media in all modes
- Prints up to 9ppm black and 7.5ppm colour



**CASH BACK**  
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(95761)

**\$420**

### HP DeskJet 970Cxi

The premier photo quality printer for professionals

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- New! Automatic two-sided printing



**CASH BACK**  
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(84363)

**\$720**

### HP DeskJet 1220C

High Performance Wide-Format InkJet Printer for All Business Needs

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- Colour 2400x1200dpi mode on photo paper with HP PhotoREt 3
- Prints up to 11ppm black and 9.5ppm colour
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(95763)

**\$950**



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### Advanced Audio Accelerator

#### Professional PCI Audio Accelerator

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- Additional wavetable connection
- Radio connector



(93476)

**\$319**



## SoundSystem



### Advanced Audio Accelerator

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- DirectSound™ 3D hardware acceleration
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- 320-voice DLS wavetable synthesizer with 2 x 8 effects
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- SoundBlaster™ Pro compatible
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(93477)

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## TerraTec



### High Quality Audio Decoder

#### High Quality Audio Decoder

- Playback of MP3 files direct from CD
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- Playlist support in the widely-used M3U format (Winamp)
- Additional installation space for a conventional 3.5 inch AT-bus harddrive
- Supports ISO9660/Joliet and FAT16/32 file systems on CD and harddrive
- Hardware MPEG decoder
- Line Out
- Separately adjustable headphone output



(99053)

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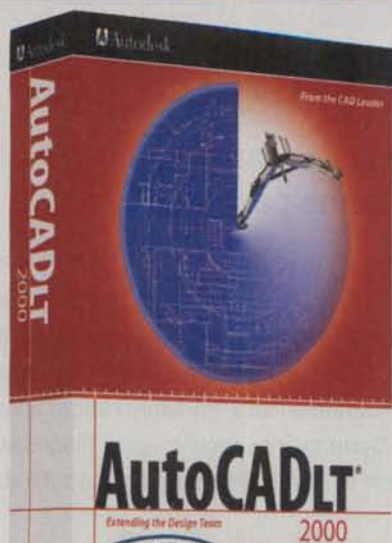
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(79021)

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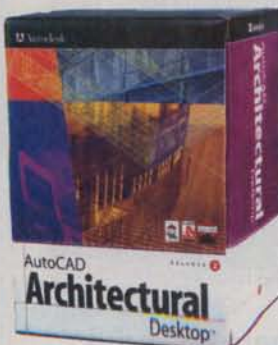
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(94497)

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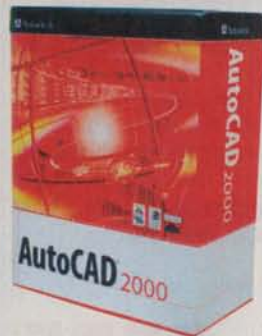
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(86114)

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### 3D Studio Max +

#### Character Studio



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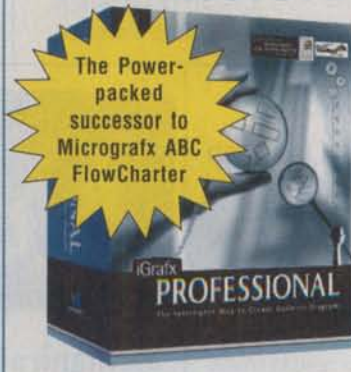
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(76631)

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(76629)

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(78475)

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Adobe GoLive 5.0



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## GoLive 5.0

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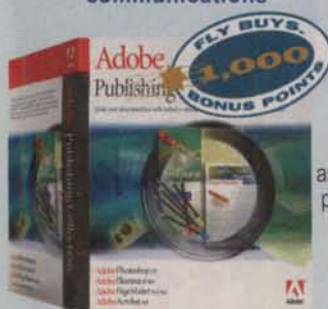
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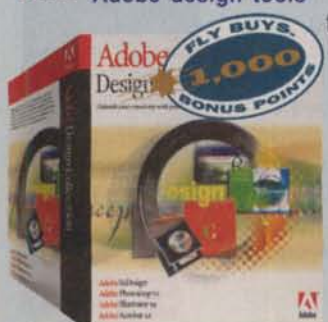


The Adobe Web Collection is a comprehensive software suite that gives you the power to design extraordinary Web graphics, & build dynamic Web sites. It includes three Adobe applications: • Adobe GoLive® • Adobe Photoshop® • Adobe Illustrator® • Plus, for a limited time: Adobe ImageStyle™

(81012) **\$1,639**

### Design Collection

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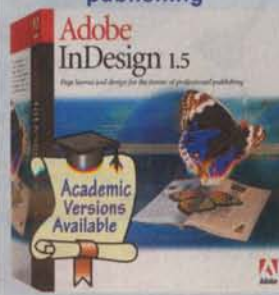


Adobe Design Collection contains the following four leading-edge design & publishing applications in one fully integrated suite: • Adobe InDesign® • Adobe Photoshop® • Adobe Illustrator® • Adobe Acrobat®. Together, these programs give you everything you need to create and produce professional images, illustrations, and layouts, and to publish documents across media.

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### InDesign 1.5

The future of professional publishing

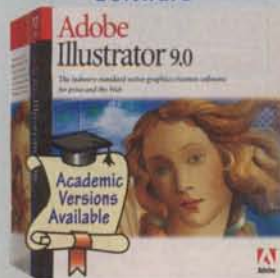


Adobe InDesign software is a new state-of-the-art page layout program that delivers unprecedented creative freedom, productivity, and precision while integrating seamlessly with Adobe's other leading design programs. Adobe InDesign removes the creative barriers presented by previously available publishing software, providing a powerful new set of tools that can shorten the distance between inspiration and reality.

(99471) **\$1,485**

### Illustrator 9.0

Sophisticated Illustration Software

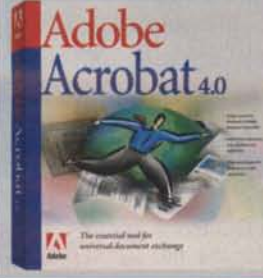


Adobe Illustrator gives you the freedom to express your creativity and the power to be more productive as you create graphically rich drawings and illustrations for printed documents, presentations, and the Web. If you need to create captivating artwork for printed documents, presentations, or the Web, count of Illustrator to let you push the limits of your creativity with top quality results every time. Explore your creativity. Boost your productivity.

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### Acrobat 4.0

The essential tool for universal document exchange



Tired of colleagues not being able to open your documents? Frustrated by software and platform incompatibilities that destroy your documents' look and feel? Adobe® Acrobat® is the most reliable, efficient way to share information electronically. It lets you convert any document into an Adobe Portable Document Format (PDF) file, with its original appearance preserved, then distribute it for viewing and printing on any system.

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### DV500

- ◆ Dual-Stream Video for Real Time FX
- ◆ Capture & edit full DV quality video DV device control with automatic scene detection
- ◆ Analogue & DV connections
- ◆ Capture and output analogue and/or DV videos



(87676)

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### DV200

- ◆ Full version of Adobe premier v5.1
- ◆ True digital / firewire capture card, for professionals
- ◆ Firewire cable & Miro Tools software to overcome 2 gig file size limitation
- ◆ 2 external firewire ports



(77104)

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- ◆ Edit your DV Video's With Studio software
- ◆ Create Video CDs and Streaming videos
- ◆ SmartCapture technology saves Hard disk space



(87677)

**\$665**

### DC30 Plus

- ◆ The professional choice for Analogue Video Capture / Editing, with Composite & S-VHS IN/OUTPUTS
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- ◆ Full version Acid Audio editing software with on Board Audio, (avoid lip Sync issues)
- ◆ Blue Break out Box



(31696)

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### Ratoc PCMCIA

- ◆ PCMCIA Digital video Firewire Capture card.
- ◆ Video Studio V3 software, CREATE AVI / MPEG-1, \*.exe files
- ◆ Never lose quality of your original Video.
- ◆ Firewire cable & mini breakout box, add background music, AND titles straight onto Video.
- ◆ Portable video editing at its best.



(99206)

**\$459**

### Media StudioPRO 6

- ◆ Award winning Video editing, with DV support, Native editing support for MPEG-1 & MPEG-2
- ◆ Video editing, runs with the Pinnacle Studio range of Video editing cards
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- ◆ Advanced timeline & track control
- ◆ Runs on 95/98/NT/2000



(99207)

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### Studio MP10

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- ◆ Capture video's into your PC.
- ◆ Edit your videos using Studio software
- ◆ Create Multimedia and Video CDs
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- ◆ Create Streaming Videos for the net



(80256)

**\$665**

### Studio PCTV USB

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(85878)

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**Pure Java  
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with integrated  
database tools**

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JBuilder 3.5**  
Professional

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### Delphi 5

Delphi 5 is the fastest, most productive Windows development tool for building Web and database applications. Delphi includes a professional IDE, WebBroker, Native Internet Components, InterBase Express, and robust debugging tools. Understand and navigate your code and data modules with the Project Browser, Code Explorer, and Data Module Designer views. Visually build components for your business with Frames. Build and reuse COM objects and servers, including a complete suite of MS Office automation controllers. Delphi increases productivity and manages the entire development cycle with over 150

reusable components, the Advanced Project Manager and the world's fastest 32-bit compiler to deliver reliable applications to market faster.

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productive Windows  
development tool**

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Delphi 5**  
Professional

(81258)

**\$1,049**

### C++ Builder

C++Builder 5 Professional combines the most powerful C++ Windows development environment for building desktop and database applications with native Internet components for building high-throughput Web applications. C++Builder increases productivity and manages the entire development cycle with over 150 reusable components, the XML Based Project Manager and a true ANSI/ISO C++ high-speed 32-bit optimizing compiler to deliver reliable applications to market faster. C++Builder includes a professional IDE, WebBroker, Native Internet Components, InterBase Express, and robust debugging tools. Use the CodeGuard™ run-time error detection tool to easily locate and diagnose memory and resource leaks on the spot. Understand and navigate your code and data modules with the Project Browser, Code Explorer, and Data Module Designer views. Visually build components for your business with Frames. Build and reuse COM objects and servers, including a complete suite of MS Office automation controllers.

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## Retrospect® Backup for Windows



### Retrospect Clients

Adds support for more networked computers. With the addition of cross-platform Retrospect Clients, use Retrospect to back up your whole network, including Windows 95, 98, NT 4.0 Workstation & Server, Mac and Windows 2000 computers. Back up any client-equipped computer on the network without installing file servers, starting file sharing, or mounting volumes.

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10-pack: (88261) **\$409**

50-pack: (88262) **\$1,690**

100-pack: (88263) **\$2,899**

### Retrospect

### Express Backup



The easiest, most reliable personal backup



(98456)

**\$109**

### Retrospect

### Desktop Backup



The best backup software for any storage device



(88034)

**\$340**

### Retrospect

### Workgroup Backup



The best, most reliable backup for your workgroup and server



(88087)

**\$699**

### Retrospect

### Server Backup



The best, most reliable backup for your entire network



(88088)

**\$1,069**

Retrospect Express Backup makes it fast and easy to back up, restore, and archive. With an interface that's easy to navigate and backups that can be accomplished in a few quick steps, Retrospect Express eliminates the hassle and inefficiency of dragging files from one volume to the next. Features include:

- **Easy, automated backups:** Backups launch automatically to run unattended on any schedule.
- **Reliable one step restores:** Restores an entire hard disk in a single step even after multiple incremental backups
- **Device Support:** Simplifies Installation by immediately recognising your backup device and automatically loading the appropriate driver.
- **Compression and Encryption:** Dramatically improves storage media capacity and decreases media costs.
- **IncrementalPLUS Technology:** After the initial backup, Retrospect Express backs up only new or changed files, saving time and storage media.

Retrospect Desktop Backup is the ultimate tool for backing up a single workstation to any storage media. It combines performance, unattended operation, low administration costs, and a complete feature set within an intuitive interface. Retrospect Desktop Backup builds on the features of Retrospect Express Backup with:

- **Expanded Device Support:** Supports most tape drives/autoloaders up to 8 slots
- **Network Ready:** Adds support for another 5, 10, 50, or 100 networked computers to your copy of Retrospect Backup with Retrospect Clients
- **Compression and encryption:** Dramatically improves storage media capacity, decreases media costs. Provides security for confidential files.
- **IncrementalPLUS™ technology:** After the initial backup, Retrospect backs up only new or changed files, saving time and storage media.
- **Duplicates:** Performs immediate or scheduled copying of any local volume, network volume, or folder to any other.
- **Archiving:** Store little-used files onto media to reduce free up hard disk space.
- **Expanded Device Support:** Supports most tape drives/autoloaders up to 8 slots

Retrospect Workgroup Backup provides powerful backup for your entire workgroup across the network to a single storage device. Integrate both desktop computers and notebooks who connect to the network at irregular times into the same backup schedule. Includes all the features of Retrospect Desktop Backup listed above, plus:

- **Central administration:** One person can manage all backup functions: eliminates lengthy user training and difficult installation at each workstation.
- **Backup Server™:** Determines which computers are most in need of backup and backs them up in order of priority, including notebooks.
- **Advanced security:** Prevents unauthorized access to sensitive data with password protection while retaining individual user's privacy. Encrypts network transfers for additional security.

INCLUDES THE RETROSPECT APPLICATION PLUS 20 CLIENTS

Retrospect Server Backup includes all of the features found in Retrospect Desktop Backup and Retrospect Workgroup Backup, as well as advanced networking capabilities.

- **Powerful networking:** Uses your existing network configuration to back up clients on any subnet. Includes powerful subnet broadcast and direct IP access for multi-network environments. INCLUDES THE RETROSPECT APPLICATION PLUS 100 CLIENTS

"Retrospect 5.0 Server Edition proved itself in every test... it earns a recommendation from the CRN Test Center." *Computer Reseller News*

"Dantz backup system's flexibility, easy of use should make it a winner...it might well become an overnight sensation." *PC Week*

"Retrospect has several unique technologies that differentiate it from other backup products.... an excellent package." *IT Graphics*

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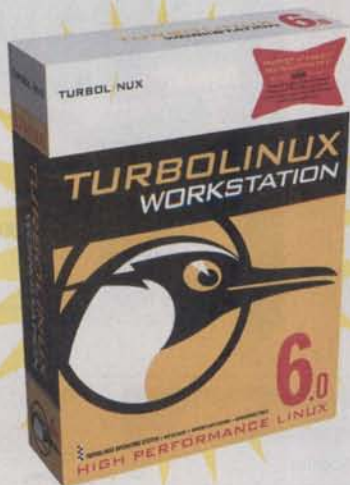
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# High Performance Linux

## TURBOLINUX WORKSTATION 6.0



TurboLinux Workstation 6.0 is the high performance choice for Linux on the desktop. It includes the powerful office productivity suite StarOffice from Sun Microsystems, and Netscape which gets you quickly online for e-mail and web surfing.

A comprehensive suite of the latest gcs 2.95.2-based developer tools and libraries puts you in control of your code. The Gimp, Xpaint and hundreds of updated packages compiled with glibc 2.1.2 keep you on the cutting edge of Linux. Even run Windows under VMWare! Choose our default GNOME desktop environment or the option of KDE or ICE Window Manager.

(99109) **\$50**

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(99766)

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(81112)

**\$155**

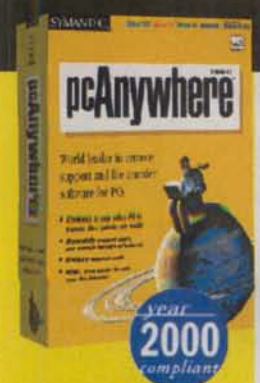


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(96427)

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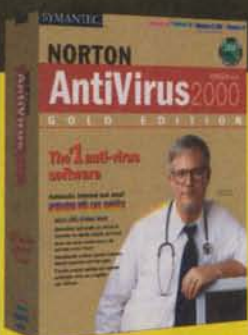
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(97684)

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Makes downloading files off the Internet safer than ever before.

- Monitors your systems in the background to prevent virus entry
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(81107)

**\$75**



Norton SystemWorks 2000 Standard (81111)

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(82484) **\$315**

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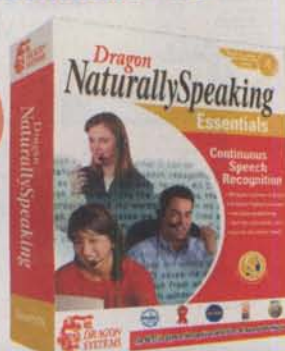


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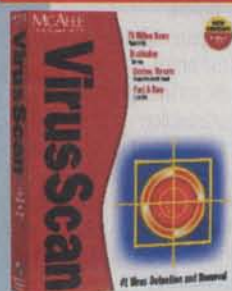
First Aid 2000 (84840)

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Nuts & Bolts Deluxe (65253)

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### VirusScan 5.0



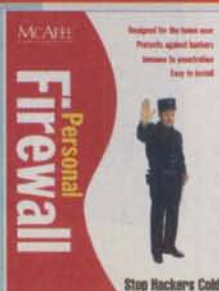
McAfee's Macro Hunter and ViruLogic technology safeguard your PC from ALL

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Analysis Microsoft Word and Excel macros, seeks and destroys unidentified macro viruses and repairs files automatically!

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Personal Firewall offers comprehensive, proactive security for consumers' PC Internet connection. Easy to use and install, the firewall works

quietly in the background, designed to protect a user's PC and valuable information contained therein from intruders on the Internet. McAfee Personal Firewall, unlike "intrusion detection" solutions, does not depend on frequent updates to provide security and protection from existing or future threats.

(99780) **\$49**

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A substantial improvement that has benefited from the experience of ezimerchant. Ezimerchant Professional builds your online store and business through a simple point and click process. Capable of handling thousands of products ezimerchant Professional suits both small and large business.

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DriveImage is the fastest, easiest tool for complete hard drive imaging. It's robust feature set makes it the perfect solution for backups, system recovery and easy hard-drive upgrades.

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(61917) **\$120**

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Excel 2000	✓	✓	✓	✓	✓
Outlook 2000	✓	✓	✓	✓	✓
Powerpoint 2000	✓		✓	✓	✓
Publisher 2000		✓	✓	✓	✓
Small Business Tools		✓	✓	✓	✓
Access 2000			✓	✓	✓
FrontPage 2000				✓	✓
PhotoDraw 2000				✓	✓
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Part number	(75956)	(75960)	(75958)	(99648)	(75957)
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- Word 2000
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- Word processing package including many design features that gear it for the Web
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## Empire building

### 1602 AD

It's new to Australia, but 1602 AD has already sold over 1 million copies in Europe (where it goes by the name Anno 1602), and in Germany it is the best-selling PC game title of all time. What makes it so good?

The game is certainly not revolutionary. Anyone who has played Caesar 3 or SimCity, or even Civilization, will feel comfortable immediately. This is an empire builder in the classic mould. You start with a ship, a few resources, and an ocean dotted with islands. Your goal is to settle one of the islands, harvest resources to supply your building and population needs and watch your colony grow. As your population increases, wealthier classes develop.

As in Caesar 3, it is your ability to meet the increasingly sophisticated needs of these citizens that determines their prosperity and the amount you can tax them.

Because your colony is on an island, resources are limited, more so than in most games of this type. It is therefore essential that you supplement your resource supply in other ways. The military option is difficult because the game is set up to make conquering a well-prepared island opponent a big challenge. The only real option then is trade, and lots of it.

1602 AD is a visually attractive game. Like Caesar 3 and Pharaoh, the citizens going about their business on the streets

indicates the status of your colony. It has the usual variety of in-game screens to consult, but the information could be better organised and more detailed.

Nevertheless, the emphasis on trade, the choice of era, and the open-ended nature of play combine to create a relaxing and engaging game. Perhaps it won't become a bestseller in this country, but it is certainly worth your consideration.

Jon Gill

<b>Contact</b>	GT Interactive
<b>Phone</b>	(02) 9902 3000
<b>Online</b>	<a href="http://www.anno1602.de/english/index.html">http://www.anno1602.de/english/index.html</a>
<b>Price</b>	\$79.95
<b>Requires</b>	Pentium 100, Windows 95, 32M RAM
<b>Classification</b>	G(8+)
<b>Rating</b>	★★★★

### Grand Prix World

Racing enthusiasts are still waiting patiently for the king of racing games — Grand Prix 3. Perhaps as an attempt to abate frustration over the constant delays, Microprose has released Grand Prix World (GPW).

However, gamers hoping to test their reflexes, skill and nerves behind the wheel will be disappointed — this is a management simulation. GPW allows you to take control of an F1 team of your choice, and try to guide it to victory in the 1998/99 season.

Unlike other F1 games, GPW requires management, liaison and commercial skills, and neglecting any of these areas will leave your team struggling just to make the starting grid. Unusually, much of GPW takes place between Grand Prix races. It is then that you tune your cars in both the labs and on the track, research new models, deal with sponsors, hire/fire staff and manage the budget. When you are happy with the specifications of the car, it is time to move to race day.



During the actual race you view the action through multiple windows which show everything from live television feeds to the progress and status of your car. You can also take more control of the race by changing the driver's orders with commands such as 'overtake more aggressively', or 'increase speed'. The race can be controlled in this way for each and every lap, or fast-forwarded to the end of the race if it becomes a tiring.

The crisp, clear graphics of the in-game menus work well, but the same can't be said for the animations in the actual race. Animation imposed over photographs rarely works, and Grand Prix World is no exception.

Sadly, Grand Prix World won't gain the recognition it deserves, due to its high level of difficulty. However, true Formula 1 aficionados will be in heaven with more options, statistics and information on Grand Prix racing than ever before.

Alan Crawford

### Guide to ratings

- ★ Slightly more fun than a terminal illness
- ★★ Dull as a weekend dose of the flu
- ★★★ Alert and responsive
- ★★★★ Bright eyed and bushy tailed
- ★★★★★ Will make you jump for joy





**Contact** Hasbro Interactive  
**Phone** (02) 9966 9899  
**Online** <http://www.grandprixgames.com/>  
**Price** \$89.95  
**Requires** Pentium 200, Windows 95, 32M RAM  
**Classification** G  
**Rating** ★★★★★

## Nerf Arena Blast

If the concept of someone's head flying at you after you've reduced their body to a fine red mist with a rocket makes you queasy, but you still have some semi-homicidal urges, then Nerf Arena Blast could be for you. If you think that a Nerf game should always be appropriate for the kiddies, think again — bizarrely, this game is rated M. We're still not sure why.

Nerf Arena Blast is Quake Arena in garish colours, but based on the Unreal engine. That's about the sum of it, so if you know you don't like either game, give it a miss.

The concept of Nerf Arena isn't original, but it does have a few twists. For a start, the basic weapon ammo sticks to walls, which looks great. You score points rather than frags, based on damage done rather than just kills. Weapons are varied, from the bog-standard suction-tip Nerf darts to the rather odd explosive Nerf (did anyone suspect Nerf was volatile?) and blunt Nerf discs à la Unreal. Apart from the basic deathmatch mode, Nerf Arena has a capture-the-flag style running race and a target-shooting version.

Will it convert Quake/Unreal junkies? Not likely. It's deliberately less violent — victims are simply knocked out, and it's very bright and garish. It's not the kind of game you want to play with a hangover, or even for more than an hour or so. Nerf Arena's target market — younger gamers, or more precisely, parents concerned about violence — will probably shy away from it because of its puzzling M rating. It's fun in a 'hey — I'm shooting soft foam at someone' way, but it's unlikely to capture too many fans, which is a pity. Underneath the

garish, Nerf-centric exterior, it is a good first-person shooter.

**Alex Kidman**

**Contact** Hasbro Interactive  
**Phone** (02) 9953 8788  
**Online** <http://www.hasbrointeractive.com/>  
**Price** \$49.95  
**Requires** Pentium 200, Windows 95  
**Classification** M  
**Rating** ★★★

## Stuart Little

The cute furry star of the latest children's movie is featured in Stuart Little Big City Adventures, a game-based program recommended for children of four and up.

It contains five appealing games ranging from car and boat races to maze-like challenges and mini golf, all linked by a simple story. Each player's scores for individual games are stored and ranked, providing the challenge of outdoing other players next time. This probably



won't be much of an incentive for younger or less competitive children, who may tire of it quickly.

The lack of precision control made the games trickier to play than you might expect. For example, holding the mouse down for a bigger swing in minigolf produced inconsistent results. Trying to control Stuart's jumps in the pantry challenge was particularly frustrating — getting him to jump where and when we wanted was annoyingly and surprisingly difficult. The straightforward racing games are among the easiest in the collection, but are still

## Games News

● I'm really not sure whether anyone is interested any more, but it seems as though Lara Croft, of Tomb Raider and Lucozade fame, really will be hitting the big screens at some point in the near future. Eidos Interactive, developer of the Tomb Raider series, has finally made the official announcement — Angelina Jolie will play Croft. Jolie recently received an Oscar for best supporting actress in *Girl, Interrupted*, and she has some experience in the techy geek oeuvre too — she starred in *Hackers* a few years back. Simon West, director of *Con Air* and *The General's Daughter*, will direct and Eidos CEO Charles Cornwall will be executive producer.

● For a long time, hackers have targeted the program files of games in the burgeoning Massively Multiplayer Online game field. Verant Interactive, developer of the deservedly popular EverQuest, has tried a unique solution to the problem. As part of a software upgrade, Verant had intended to enable its servers to examine users' computers for 'hacking tools'; those who would not allow access to their files would be banned from the game. Not surprisingly, when players learned of Verant's plans there was a major outcry.

Verant quickly backed down, and CEO John Smedley admitted that "we owe an apology to our player base... in our haste to try and stop people from damaging the game, we went overboard." It was all a bit too Big Brother to be palatable, but if MMORPGs are to be the 'games of the future', something is going to have to be done to stop players cheating in these games.

● Ever since the dawn of mass market computer use, Creative has been at the forefront of audio cards and related devices, and no real competitors have managed to survive for long. Aureal, which developed some outstanding 3D sound technology called A3D (aimed primarily at gamers), has filed for bankruptcy after the CEO and senior management resigned a short time ago. For the past few years, Aureal soundcards had been the main competitor to Creative's Sound Blaster Live range, and rumours of Creative making a move to acquire Aureal are growing stronger all the time. It's unfortunate that there is no longer any meaningful competition in this area.

**Gamespy**







quite difficult for children in the target age group. Although the instructions are quite clear, there is little encouragement or advice on how to improve and you simply fail by running out of time.

Although the box boasts realistic 3D graphics, they are actually quite simple. Apart from that, what is advertised on the box is what you get. The only extra game-play feature is that you can print achievement certificates and pictures of Stuart in colour.

Stuart Little is good fun, but it's best suited to seven to 10-year-olds who can cope with the frustration caused by the controls.

**Catherine Howard**

<b>Contact</b>	Hasbro Interactive
<b>Phone</b>	(02) 9966 9899
<b>Online</b>	http://www.hasbrointeractive.com/
<b>Price</b>	\$49.95
<b>Requires</b>	Pentium 133, Windows 95, 32M RAM
<b>Classification</b>	G
<b>Rating</b>	★★★

## Battlecruiser 3000AD

The game's packaging screams out 'Accelerated 3Dfx graphics'. This is what caught my eye at first, but how wrong could it be? To be honest, this game is awful.

*The year is 3000AD;* you are a commander of a battlecruiser, fresh out of the academy. The galaxy is about to erupt into intergalactic war, and parts of the fleet have been attacked by an unidentifiable enemy. Just your usual doomsday scenario.

The game fails in three major areas. The first is gameplay. There are so many key commands for different parts of the ship (weapons systems, tactical scanners, flight controls). On top of that, there are other aircraft that are also under your control. The game is hindered greatly by the fact that you have to keep double-checking the game guide to see if you are pressing the right keys. You would have to be a genius to remember them all.

The graphics have changed very little since the prequel to this game, *Battlecruiser 1.0*. Because the entire game is written for DOS, owners of older PCs are able to have a go, but some advanced gamers may find it rather annoying. The graphics are extremely blocky, even on some high-end systems capable of higher resolutions.

Finally, the physics of the game are horrible, and turning some of the fighter aircraft is a task in itself. However, enemy aircraft have no problem. Multiple bogeys come from every direction, fortifying their position while you're still busy trying to figure out how to turn your aircraft around.



For those gamers who want to give their neglected old PCs a workout, this game is for you. As for advanced gamers, give this game a miss; it's outdated and annoying.

**Ryan Shaw**

<b>Contact</b>	Jack of All Games
<b>Phone</b>	(02) 9482 3455
<b>Online</b>	http://www.3do.com/
<b>Price</b>	\$79.95
<b>Requires</b>	Pentium 166, Windows 95, 16M RAM
<b>Classification</b>	G
<b>Rating</b>	★☆☆

## Force Commander

George Lucas must be losing it. First the Ewoks, then Jar Jar, and now Force Commander. The really annoying thing about all three? Although they're irritating beyond belief, at the back of your mind, you know that someone's going to spend money on them anyway. At least

we can be thankful that Force Commander doesn't try to be cute.

If there's a game genre that sells, you can bet that LucasArts will use it for a Star Wars game (for instance, *X-Wing/Wing Commander*, *Doom/Dark Forces*, *Phantom Menace/Tomb Raider*). Force Commander is LucasArts' answer to Command & Conquer. It's set in the Star Wars Universe. It's even in 3D. All this sounds great, but the reality is something completely different, and it's primarily the 3D engine that's to blame.

Force Commander uses the usual troop control ideas (dragging to select groups, assignable group numbers, and so on) quite well. However, the camera control is where it all falls apart; the 3D controls are horrible. Click to select a unit, and you'll get a poor view of them. Try to spin the view to facilitate combat, and the camera will end up behind a huge rock so you can't see your troops at all. Zoom in on your troops and you'll realise that they're actually not all that good to look at — even with a high-spec graphics card they're blocky and unremarkable.

Because you constantly have to fiddle with even the smallest camera movements, you can't adequately plan attacks, pull out dying soldiers or commandeer resources. Force Commander also uses an odd system whereby most troops have to be 'requested' from dropships, rather than the standard harvest resource/build troop model. This means you have to stick to the exact battleplan for each mission, otherwise it's no troops for you.

Perhaps I'm missing something, but it seems to me that Force Commander just plain sucks.

**Alex Kidman**

<b>Contact</b>	Metro
<b>Phone</b>	(03) 9329 2999
<b>Online</b>	http://www.lucasgames.com/
<b>Price</b>	\$79.95
<b>Requires</b>	Pentium 266, 64M RAM
<b>Classification</b>	G(8+)
<b>Rating</b>	★☆☆





SPECIAL REPORT

# The best PlayStation

Even if the PC is your preferred gaming platform, chances are you also have a PlayStation and may be tempted by the forthcoming PlayStation2 — complete with DVD and Internet access. In the first part of a series selecting the best games for a particular platform or genre, APC identifies the 10 best-ever games on the PlayStation, and the ones to avoid at all costs.

## Gran Turismo

There are plenty of good PlayStation racing games, including the Need for Speed and Ridge Racer series. There are fewer good games that force you to actually drive a car properly, and

Gran Turismo is quite simply the best of the best of these games. Great controls, a unique licence structure and classy graphics make Gran Turismo compelling. APC selected the budget option of the original title, but the sequel is mighty fine too.



## Final Fantasy VII

Console RPGs are few and far between in Australia. Some are awful, but Final Fantasy VII single-handedly revitalised the genre with its strong emphasis on the story-line and some

fantastic graphic flair. The sequel looks a whole lot better, but it lacks the strong combat dynamics of Final Fantasy VII. Version seven is now a Platinum title (which means you can pick it up for about \$40), and is packed with at least 30 hours of gameplay.



## Crash Bandicoot 2

Possibly the only games series on PlayStation to feature an Australian mammal — albeit a hideously deformed one in cut-

off shorts — Crash Bandicoot 2 is pure, unmitigated fun. All the games in the series are good, but APC chose the second for the top 10 because it's a big step up from the simpler original game, and it's also a budget title that is widely available.



## Resident Evil 2

If horror is to your taste, you can't go past Resident Evil. From endless hordes of zombies to some of the worst voice acting outside of Monkey, the Resident Evil series delivers in spades.

Version two stole the show with its better graphics, better loading times and just a touch more ooze and blood. Loading times can be frustrating, but the plot complexities and the pure joy of opening up on a zombie with a shotgun just can't be beaten.



## Tomb Raider 3

Core won big when it created Lara Croft and four games later, it's still winning. Tomb Raider is best described as a playable version of Prince of Persia in 3D with a buxom female protagonist. In Tomb Raider 3, the series hit its stride with the best mix of puzzles and action you're likely to see for a long time. A Tomb Raider movie, starring Angelina Jolie, is currently in production.



## FIFA 2000

One of the real joys of consoles is that you can play multiplayer in a comfortable environment. FIFA is the single best multiplayer PlayStation game we've ever seen. You just can't beat the chaos that ensues when you have four adults sitting in front of a screen, screaming for a pass, yodelling for a shot at goal and making complete damn fools of themselves when they finally score.





# games ever



## Bust-A-Move 4

One APC staffer has effectively lost his wife thanks to her Bust-A-Move addiction. The premise is simple: link lines of similar bubbles, Tetris-style, and they'll fall harmlessly. Fail, and the flow of bubbles will crush you. There are three Bust-A-Moves out there (not to be confused with the dancing game called Bust-A-Groove), and they're all quite similar. However, you may have some trouble finding version 2 or 3 in the shops.



## Metal Gear Solid

Part spy sim, part interactive movie, Metal Gear Solid pushes the PlayStation in terms of graphics and gameplay. It's not an incredibly long game, but with a few replay hooks and a compelling story-line you'll be too busy having fun to notice. Spot-on controls allow you to wreak havoc. Metal Gear Solid was a long time in production, but it's proof that care in crafting games should always be the first priority.

## Tekken 3

People like games where you hit things — and Tekken 3 allows you to hit an awful lot of things, from priests in puma costumes to bizarre Japanese dinosaurs. The graphics and gameplay are great fun, and the complexity of moves and variety of characters keep you coming back time and time again. Play it in 'one player' mode and it'll become a little easier. Get a friend to join in, and the real fun begins.



## Games that nearly made it

Bust-A-Groove, Raiden Project, Bubble Bobble, Twisted Metal World Tour, Croc, Need For Speed 3, Track and Field, Die Hard Trilogy, Syphon Filter.

## Worst PlayStation games — avoid at all costs

**WCW Thunder** This wrestling game is possibly the worst PlayStation game ever.

**Iznogoud** A platformer that lives down to its title.

**Contra: Legacy Of War** Even the inclusion of hokey 3D glasses can't save this turkey.

**Fantastic Four** When the game that runs during loading breaks is better than the game itself...



**Chef's Luv Shack** The worst trivia game ever devised, with the longest loading times.

**Spice World** When even Spice Girls fans shun a game, you know it has to be bad.

## Nuclear Strike

There aren't many series of games which have survived the transition from 16-bit to 32-bit consoles, but EA's Strike series managed it comfortably. Part action shoot 'em up, part strategy game, Nuclear Strike (and its immediate predecessor, Soviet Strike) is compelling fare for anyone who ever wanted to blow stuff up. It uses cutscenes sparingly but effectively, to draw you into being a member of the strike force, and then sends you out into the field. War may be hell, but hell, it's good fun.





Navigate Australia or the ancient world, design a living space or focus on grammar.

## On a small scale

### Compton's Atlas of the Ancient World

Ancient history is presented in a comprehensive and interactive way in Compton's Atlas of the Ancient World, a CD-ROM compiled by experts for use by all ages.

From a timeline of 5 million years, 44 major civilisations across all continents can be investigated in written, spoken and pictorial form. There are also animated maps where historical developments, such as wars, unfold before your eyes. You feel as if you are there in the virtual reality tours of famous tombs; music can be played on ancient instruments and animated pictures recreate everyday lives. However, perhaps the most interesting feature of this product is the 11 interactive sites where you can unearth treasures — just like in a real archaeological dig — by removing layers and clicking on hotspots.

Unfortunately, the navigation devices used are cumbersome. To access information on a particular civilisation, you are confronted by a 'road map' that does not fit in the window and is therefore difficult to see as a whole. This map may not give access to the information in the way you require it, so to gather all your facts you have to skim through various windows and bookmark them — rather like using a textbook. There seems to be no provision for searching for all the information on one topic, which is what a student would need to do to research an assignment.

The other main way of accessing information — through pictorial index windows for the interactive features — does not provide information about geographical

location. If you don't know where the Pazyryk Valley is, for example, you'll need another reference work.

Atlas of the Ancient World covers all major civilisations (although it's a little sketchy on Aboriginal culture) in an interesting and informative way. It would be of great interest to would-be archaeologists despite being a little awkward to use.

**Catherine Howard**

<b>Publisher</b>	The Learning Company
<b>Contact</b>	Roadshow Interactive
<b>Phone</b>	(02) 9552 8700
<b>Price</b>	\$69.95
<b>Requires</b>	Pentium 90, Windows 95, 16M RAM
<b>Rating</b>	★★★

### Custom Home: 3D Design and Decor

Trying to explain to an architect that you want a mud-hut-style dome with built-in solar panels and a hi-fi sound system under the floor can be a bit tricky. Not to mention expensive. This is where a program like Custom Home 3D Design and Decor comes in very handy. It allows you to come up with the most ludicrous living space designs you can think of, then draw them, visualise them in 3D and look around inside afterwards.

Although the main module, Home Architect 3.0, has a wide variety of almost nauseatingly bland Amerihome templates, every aspect — floor plan, windows, roof, doors, surface texture — can be customised.

The interface is excellent. Intuitive drag and drop operation is used throughout, and there is a very helpful audio/example guide to almost every operation. Good value all round. Once the floor plan is fixed using Layout, you can use the Decorate menu to fill your virtual home with furniture, lighting, and what is charmingly termed 'bric-a-brac' (cardboard boxes, pots, pans and so on). You can even choose the view out of your custom-designed windows.

The other two modules, Photo Home Interiors and Interior Design Collection are much less impressive. The former allows you to superimpose a range of



rather blocky 3D furniture and interior decoration items on an image of your room. It is not terribly practical, and the furniture designs are very basic.

The other program, Interior Design Collection, seems little more than a back-door way to sell home decoration products over a built-in Web link using very polished photo images of still-life room settings.

However, even if you throw away the other two programs, Home Architect 3.0 is fast, slick and usable enough to make the asking price worthwhile.

**Jeremy Torr**

<b>Publisher</b>	Sierra
<b>Contact</b>	Dataflow
<b>Phone</b>	(02) 9420 6700
<b>Price</b>	\$79.95
<b>Requires</b>	Pentium 133, Windows 95, 16M RAM
<b>Rating</b>	★★★★

### Phonics Alive 4 Grammar

From a range of educational CD-ROMs produced by Advanced Software comes Phonics Alive 4 Grammar, suitable for children of about eight years up to adults who are learning English as a second language or needing a refresher course in the correct use of grammar.

Set in a space station, there are 14 modules to complete, from the use of nouns, pronouns, adjectives, verbs and adverbs through to sentence structure, homophones and punctuation. Each module has four parts, and there is plenty of reinforcement to the concept being taught. The games are simple to play and well explained, with rewards for successful completion and explanations for mistakes. They are accompanied by simple







but adequate graphics that are amusing in parts. Navigation around the space station is very easy; the control room allows you to access any module and takes students to their next task.

There is a lot of repetition involved in each individual game and in the games across modules. It can also save individual scores and print out certificates. Consequently, it seems a product more suited to a school situation where it would be used occasionally to reinforce classroom teaching, rather than a home-based product where there is usually more use of games. It is good to see an Australian product like this, but the packaging is a bit misleading — it has little to do with phonics and the number four may suggest it is only for grade four, as there is no age recommendation given. Although this is a well-produced educational program, it is unlikely to be engaging enough for home use unless you have a very structured learning environment.

Catherine Howard

<b>Publisher</b>	Advanced Software
<b>Contact</b>	Scholastic New Media
<b>Phone</b>	(02) 4328 3555
<b>Price</b>	\$89.95
<b>Requires</b>	Pentium 133, Windows 95, 32M RAM
<b>Rating</b>	★★★☆☆

## Australia Unfolded: Interactive Atlas of Australia 2

What a title! I was expecting echidnas to come at me in 3D, the sound of cockies exploding out of dead gum trees and perhaps a virtual cave dive in some South Australian freshwater sinkhole. Nope — but there are a lot of maps.

The concept is very noble: take all the data maps collected by AUSLIG (Australian Surveying and Land Information Group) and patch them together in a fully zoomable format and whack it on CD. So far, so good.

However, when the maps don't join quite right and you get truncated place

## Interactive News

● Wireless network communication is a whole new age, according to chief technical officer of OracleMobile.com (Oracle's wireless-oriented spin-off). Intel, Motorola, 3Com, Cisco and Lucent all seem to agree, as they're all trying to gain a foothold in this developing industry. There is still the usual disagreement over which standards to adopt. There are two main standards: 'HomeRF' which runs at 2Mbps and '802.11B' which can run at 11Mbps. Intel, Motorola and others are backing HomeRF for use in the home, and 802.11B for use in business networking. 3Com, Cisco, Lucent and NetGear, however, don't support HomeRF at all, just 802.11B across the board. Not surprisingly, the two standards aren't compatible, although both standards will work with the new 'hot technology' Bluetooth. Both sets of companies are on the verge of releasing wireless kits and sewing up OEM deals, so it might be best to see how it pans out before you buy.

● Sphere Technology's new OmniPlayer device is making waves in all the right places. Dubbed 'the first and only Universal Portable Device (UPD)', the OmniPlayer has the capability to store, record and play music in a range of

formats, work as a mobile phone, a GPS, a WAP-enabled Web browser, use scheduling software and two-way messaging, along with whatever else Sphere comes up with in the near future. With patented technology, new functions can be added to the OmniPlayer simply by changing the cover of the device, but so far all it can do is play, record and store digitised music.

● Finally, more in the saga of DVD and the encryption code crack. DVD units and movies are still selling like hotcakes in the US, Asia and Europe, but the infamous DeCSS software is still proving a real annoyance to the major corporations that back the CSS (Content Scrambling System) standard. DeCSS can copy DVD movies, remove the CSS encryption and save the movie files to a hard disk. There's bound to be more judicial action in the US in the months to come, but at the moment lawyers defending DeCSS argue that it's constitutionally protected free speech under the first amendment. The 16-year-old Norwegian student who created deCSS claims that the program was created to enable the development of a Linux DVD player, something the corporations haven't yet bothered with.

Gareth Jones

names instead of the whole thing; when the zooming means a jump to another set of (larger scale) maps and consequent loss of previous information; when the text options you can write over the top are basic at best; then the reality seems less attractive.

Searching is also a bit limited, although the number of locations — some 55,000 — is impressive. To search for Lake Eyre, you need to look for Eyre, Lake. A bit silly given today's smart search engines.

That's not to say the whole CD is a dud. It isn't. The way you can layer information

according to your requirements is superb. Airports, swamps, mountains, rivers, names, railways, roads, states and reefs can all be selected or removed at will.

You can draw on existing maps and add your own secret outback locations, which is also a real plus. For GPS enthusiasts, all locations — even that of the cursor if you are in the middle of nowhere — have exact location references.

The big question is, who would buy this CD? It might be good for schools, but the depth of information is probably beyond their needs. It would be good for trip planning, but the presentation really isn't that attractive. If somebody gave it to me as a present, I might keep it. Maybe.

Jeremy Torr



<b>Publisher</b>	AUSLIG
<b>Contact</b>	Dataworks
<b>Phone</b>	(03) 9764 8344
<b>Price</b>	\$69.95
<b>Requires</b>	Pentium 100, Windows 95, 32M RAM
<b>Rating</b>	★★



## SPECIAL REPORT

# From silver screen

Although watching movie Netcasts is still a long way down the track for Australian audiences, it's now possible to download movies as easily as music, and films are being produced specifically for Net distribution. **Darren Ellis** takes a look at the first made-for-download movie.

**U**nless you live in the US, where high-speed Internet access is commonplace, the Internet is *not* going to replace television for viewing movies in the near future, no matter what you may have heard. The quality of compression needed to stream video at normal speeds greatly decreases the sound and video quality, so this is not a viable alternative for Australian audiences. But what about using the Internet as a means of delivery? It works for music, why not movies?

Well, it's already happening. Recently, the first movie to be written and filmed for distribution exclusively over the Internet was released. *Quantum Project: The Movie* is not the first film to be distributed this way; movies have been available as downloads

for two years or more, but all the previous downloadable movies had been prereleased in cinemas, or on TV or video.

*Quantum Project* was penned by David Aaron Cohen (who co-wrote *The Devil's Own* and *VI Warshawski*) and directed by former production designer, Eugenio Zanetti (*The Haunting*, *What Dreams May Come*). *Quantum Project* stars Stephen Dorff (*Blade*, *Power of One*), John Cleese (*The World is Not Enough*) and Fay Masterson (*Eyes Wide Shut*, *The Quick and the Dead*).

The premise for the plot sounds weak, and the teaser trailer looks low budget, but this could be a result of the scant details released at press time. The site's review describes it as follows: "Physicist Paul Pentcho (Stephen Dorff) is on a collision

## Directors get their cut

*Quantum Project* may be the first professionally created movie to get a Net-exclusive release, but Hollywood is clearly gearing up to distribute more movies this way. For proof, look no further than the Director's Guild of America (DGA), essentially the trade union for movie directors in the US, which recently updated its film agreements (the equivalent of awards determining wages, salaries and conditions) to take account of the growing trend towards Net-only production.

In early April, the DGA announced that it had created new agreements specifically

designed for single-picture productions, aimed exclusively at online audiences. The new deal was modelled on existing agreements for low-budget films.

DGA agreements cover the areas of creative rights, credits, salaries and residuals. There have been few changes on the creative side of the deal, but the payment model has altered considerably. Recognising that few people are willing to pay for online content, the deal currently doesn't allow for residual payments each time a movie has screened — a standard





# to Net streaming

course with life. Sparks fly as he is poised to connect with his former girlfriend (Fay Masterson) until he reels away into a series of mind-rocking events. An almost fatal reunion with his own father (John Cleese) shocks Pentcho into his own Quantum Realization. For Pentcho this means one final collision course with destiny." Hmmm. Still, it has impressive special effects, created by Metafilmics (*What Dreams May Come*) and its Net distribution is a drawcard.

Quantum Project's distributor, SightSound (<http://www.sightsound.com/>), is no stranger to making history on the Net. In 1995, it was the first site to sell music online, and in 1996 it was the first site to distribute a full-length feature movie, Darren Aronofsky's *Pi*. Today, there are many other movies available on the site, but these tend to be cult favourites or direct-to-video fare.

To get into the spirit of things, APC downloaded a copy of *Tromeo and Juliet* (a cult movie from the renowned makers of the *Toxic Avenger* series). Downloading the movie (a 240M executable zip file) from Australia took almost 12 hours, with wavering speeds all day on a 1Mbps connection.



SightSound captures the movies as ASF files, which access the Web site when run for the first time. At this point, you have to pay for the movie. The price depends on whether you want to rent it for a day or two, or buy it outright. Purchasing *Tromeo and Juliet* costs \$US14.98. Once payment has been finalised (which only takes a matter of seconds), you are free to watch the movie. However, you cannot run SightSound movies on any system other than the one you used

when you paid for it. To watch it on another system requires another payment. This is great for piracy prevention, but not so great if you want to download and pay for it on one system and then watch it on another. However, there is another option: you can download it on one system, transfer it to another, then make the payment from the second system. In terms of picture quality, the movie was watchable, but the sound and video were far below TV quality.

Quantum Project should set the standard for things to come. Once broadband access in Australia is faster and more widespread, you could be downloading movies off the Net instead of popping into the local video store.

Popcorn, anyone?

feature in other DGA deals, but economically difficult in a streaming media environment.

However, the DGA isn't planning to maintain this generosity forever. "The guild is offering these special arrangements for a limited time, until the economics of Internet production and distribution become clearer," it said in a statement issued to members. "These agreements will help the guild monitor economic developments in this area." In other words: if any opportunity to make cash out of this comes up, we want our cut.

Of course, amateur film-makers, who mostly see the Net as a means of bypassing current studio systems and of achieving visibility, are unlikely to be concerned by the DGA deal. However, the arrival of the new agreement, even in an embryonic form, demonstrates that even the studio system is recognising that it can't afford to ignore or pillory the Net any longer.

It appears that the time has come for film-makers to start embracing the Net.

Angus Kidman





Does the history of personal computing point to technological utopia?

## Burning issues

### Fire in the Valley: The Making of the Personal Computer

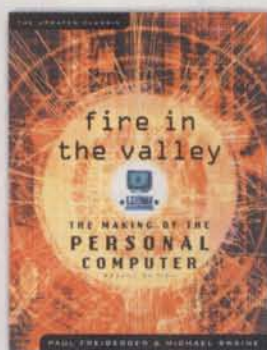
Those who have been involved in the computer industry since the 1970s will find this book an intriguing read. It is one of the most comprehensive, well-researched accounts of the "single largest legal accumulation of wealth over the last century" — the success of personal computing.

Authors Michael Swaine and Paul Freiberger are eminently qualified to write such a book. Michael Swaine is editor-at-large for *Dr. Dobbs Journal*, and over the last 20 years has written over 900 articles on computers and technology. Paul Freiberger has been a computer columnist and reporter for a range of publications. They met in 1981 when working on *InfoWorld*, a magazine they call "a perfect perch from which to watch history take place".

The first edition was published in 1984, and this new edition adds coverage of the rise of the Internet and the World Wide Web, and the role Netscape and Sun have played. *Fire in the Valley* leaves no stone unturned as it reveals in substantial detail the events of the last 30 years: the teenage exploits of Bill Gates and Paul Allen; Steve Dompier's demonstration that personal computing was here, now, at a Homebrew Computer Club meeting in 1975; the building of software empires; through to the development of networked computers, windowing and the mouse.

Given that both authors are computer journalists, it's not surprising that there is a chapter devoted to the role of magazines, user groups and exhibitions in the development of the personal computer. A sign of the times is captured in a photo of exhibitors preparing posters for their stand at the first West Coast Computer Faire in 1977 using cardboard and felt pens.

There are over 120 photographs that provide a pleasant retreat from reading, including a shot of Steve Wozniak scrambling for a phone on the floor of one of Apple's early, cluttered offices, and an amusing Osborne 1 advertisement, showing how it could be taken on board an aero-



plane. As the caption said, fitting it under the seat was another story — it was the size of a sewing machine, and looked just as heavy.

It takes commitment to plough through any 463-page tome, but this one is a true classic. The authors have just the right mix of fact, personal accounts and anecdotes to make it an easy, enjoyable read.

Cathie Kennedy

<b>Authors</b>	Paul Freiberger and Michael Swaine
<b>Publisher</b>	McGraw-Hill
<b>Contact</b>	McGraw-Hill Australia
<b>Phone</b>	\$34.95
<b>Price</b>	(02) 9415 9899
<b>ISBN</b>	0-07-135892-7
<b>Rating</b>	★★★★★

### Utopias, Dolphins and Computers: Problems of Philosophical Plumbing

This book begins by comparing philosophy and plumbing, arguing that they are both systems which develop along with a culture, and that both need upgrading from time to time to better serve that culture as it changes. Unlike problems with water and sewage, the author writes, problems with a system of thought "don't drip audibly through the ceiling or swamp the kitchen floor. They just quietly distort and obstruct our thinking." This plumbing analogy is not fully developed in *Utopias* — a collection of essays by moral philosopher Mary Midgley on a wide range of topics such as the environment, animal rights, feminism and artificial intelligence (AI) — and is unsuccessful in its attempts to bring the various chapters together.

It would have been interesting to see Midgley extend the plumbing analogy to the vast networks of data cables which connect the wealthier cities of the world, as those networks could be seen as a plumbing system for data, but Midgley does not

have an entirely positive view of information technology. "I don't think that my voice is really needed to add to the current celebrations of the cybernetic revolutions," Midgley writes. "The imagery of computers . . . pervades our world-picture just as astrology pervaded that of the Renaissance and clockwork machinery pervaded that of the Enlightenment."

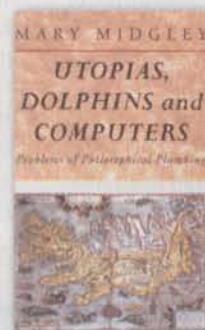
Midgley rightly rejects some of the current visions of technological utopia as unlikely and undesirable, but her scepticism about the saving graces of technology will potentially alienate many of her younger readers. In contrast to the idea that AI will help humans solve moral and philosophical problems that we have been unable to solve by ourselves, she writes that there are already enough skilled problem-solvers, but those people don't often choose the right problems to solve. "Very high intelligence is running to waste all around us in neurosis, alcoholism and depression, in feuds and organized crime, in various kinds of obsession and now through special sinks provided for it called computer games."

This attempt to pathologise computer gaming is unfortunate, as gaming could also be seen as a way of training or developing one's problem-solving skills.

Midgley does not believe it is possible for philosophers or scientists

to come up with a grand unifying theory or perfect model, preferring a combination of approaches, but in her support for an 'organic' philosophy, she is too quick to reject technology and she mentions the Internet only briefly. More recent philosophers have suggested that this distinction between nature and culture, or life and technology, is a false and limiting one.

Glenn Phillips



<b>Author</b>	Mary Midgley
<b>Publisher</b>	Routledge
<b>Contact</b>	John Wiley
<b>Phone</b>	(02) 9805 1100
<b>Price</b>	\$24.95
<b>ISBN</b>	0-415-13378-5
<b>Rating</b>	★★★



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## SPECIAL REPORT

# The darker side of Disney online

The name Walt Disney is generally synonymous with wholesome family entertainment, friendly animated fare and massive, globe-straddling theme parks. But Disney's attempts to extend its wings into the world of online entertainment have been marked by controversy, lawsuits and chaos. Why isn't the Mouse House at home on the Net?

On the surface, a partnership with Disney might seem a highly desirable goal for any business hoping to establish an online presence. Succeeding on the Net is largely a question of branding, and Disney owns some of the world's most recognisable, and highly exploited, brands.

Certainly eisa, the ISP that wants to turn itself into the mouse that roared by buying out OzEmail, appears to think so. It is keenly pursuing a partnership with Disney in the Asia-Pacific region, adding a new chapter to the already bizarre story of Disney's Web presence.

What started as a one-man animation operation in the 1920s, has grown into a global media giant with a 'family friendly' image, making it one of the world's most recognised corporate entities. However, there's a darker side to Disney's Net ambitions — and it doesn't just involve the numerous urban myth sites with the dirt on everything from rumours that Walt Disney has been cryogenically frozen (false) to reports of sex scenes inserted in animation frames (true, at least in some instances). At the corporate level, Disney's move into the online world hasn't been particularly smooth or profitable.

eisa might have been happier if Disney had chosen to fork out some money to help fund its OzEmail takeover. With a market capitalisation of over \$US84 billion, it could certainly afford to do so. Instead, it is looking at a content-only deal that gives eisa exclusive rights to the revenue from online content from some of Disney's stable of online properties.

Those properties derive from three main sources: Disney's own content (its animated characters and movie division), its ownership of US television network ABC, and its buyout in 1998 and 1999 of portal aspirant Infoseek. Following that acquisition, Disney rolled the online frontage of all those properties into a megaportal known as Go Network, which is separately listed on the NYSE.

The network includes successful sites such as ESPN, Mr Showbiz and Disney's Club Blast. However, the development of Go has not been without controversy.

In February 1999, rival portal site GoTo.com sued the Go Network, claiming

an under-age girl in a chat room. McNaughton was arrested following a police sting operation, and convicted of possessing child pornography in December. He faces sentencing on other charges this month.

Many media operators have abandoned the 'single network' approach favoured by the Go Network, in which visitors to disney.com, for instance, are redirected to disney.go.com. Time Warner dropped its similar (and massively unprofitable) Pathfinder branding and strategy even before announcing its planned merger with AOL. (That merger led to a brief period of speculation that Disney might merge with Yahoo.)

Most importantly, Disney, like most of its portal rivals, hasn't yet turned a profit from Go.com. In January, Disney outlined plans to rework the site and focus on its entertainment properties, following an announcement of a \$US1 billion loss for the network. Total revenue for the year was \$US200 million.

The company has had some success blending its new media properties with its other operations. A recent interactive broadcast in the US of the TV quiz show *Who Wants to Be a Millionaire?* attracted more than 1 million participants, who answered questions on their computer at the same time as contestants grappled with them onscreen.

However, the success of these programs in the Australian market will depend heavily on access to suitable broadband networks. This is unlikely to eventuate as Australia's cable infrastructure is controlled by two of eisa's main rivals. Disney last year explored a broadband partnership with Optus, which already offers the Disney Channel on its pay TV service, but no deal resulted. Whether its new partnership allows Mickey and Company to dominate the Australian market remains to be seen, but if history is any guide, the road ahead will be somewhat rocky.

Angus Kidman



the new site's logo was too similar to its own. In January this year, Disney was forced to replace the logo throughout its network of sites — an exercise reported to have cost \$US40 million.

Even more damaging to the company's carefully nurtured 'family' image was the revelation last year that former Infoseek executive Patrick McNaughton had been arrested for attempting to solicit sex from



Despite all the hype about MP3s, free and legal music formats are readily available for download.

# MP3 mania

## MP3.com and My.MP3.com

Well, it beat everyone else to the name, but what about the content? MP3.com is a no-frills site (some would say badly in need of a revamp) which offers music for sale and download and makes good use of streaming for instant listening. Its sister site, My.MP3.com, puts a customisable interface over the original.

The sites' creators say they are putting the music business back into the hands of musicians. The proceeds from each CD sold through MP3.com are split 50/50 between the site and the artist. The CDs sell for much lower prices than CDs produced by the established music industry.

From the home page, users can browse music by category in a similar manner to using the Yahoo index of Web sites. However, the selection on offer is meagre compared to something like Spinner.com. My.MP3.com provides a customisable workspace for MP3 listeners. Just create an account, log in and modify your personal 'inbox' to list the tracks and albums you want to hear most often.

The site's most revolutionary feature is Beam-it which allows you to put an audio CD in your drive and have it 'scanned'. You download the Beam-it software and let it look at your music collection, CD by CD, and the My.MP3.com site then allows you to listen to those tracks via MP3 streaming. This is convenient, but it is also open to abuse, for example, anyone can put a friend's CD in their drive once, then return it while retaining the right to listen to that CD any time.

**Simon Vandore**

**Online** <http://www.mp3.com/> and <http://my.mp3.com/>

**Rating** ★★★



## WindowsMedia.com

MTV and top 40 fans, this site is for you. WindowsMedia.com not only has music, but links to video clips, live radio, weather reports, entertainment news and even Webcams.

If you're after music, then you'll need Windows Media Player. Almost all the files on WindowsMedia.com are in Microsoft's WMA format, so if you want MP3s look elsewhere. Nearly all the files here are linked from other sites and you'll have to pay to listen to more than the preview, so you'll need a credit card. There's no real archive of songs either.

Still, there's a lot more here than just music. Click on 'radio' for a worldwide list of Internet radio stations, including sev-



eral in Australia. There's also a list of upcoming Webcasts to put in your diary, and links to lots of music videos. Microsoft has included links to just about anything that runs in Windows Media Player — news footage, movie previews and business and technology multimedia. There's even Bloomberg, Fox Sports and BBC World footage for cable Internet users.

**William Maher**

**Online** <http://www.windowsmedia.com/>

**Rating** ★★☆☆

## Audiogalaxy

Audiogalaxy is more than just a collection of music to download; it describes itself as "a community of music fans and artists". This comprehensive site showcases little-known artists and provides a wide range of information on the MP3 phenomenon, catering for all levels of expertise.



The site's help menu will get even complete novices started in no time. Click on 'inside audio' on the opening page to check out summaries of the latest software and hardware with links to more detailed information and downloads. There's also information on record labels, and you can visit the bulletin board to participate in general discussions or give feedback to artists on their work.

When you select one of the nine music categories, you are given a general outline of the genre. Each MP3 has a review and rating, links to information on the band or a link to its Web site, and a feedback option.

The inclusion of the 'sounds like' postscript for each song is a handy guide to whether or not it's likely to be your cup of tea. It's a great way to hear the type of music you like by artists you would normally never be exposed to, but if you're looking for chart-topping favourites, you'll be horribly disappointed.

**Gail Lipscombe**

**Online** <http://www.audiogalaxy.com/>

**Rating** ★★★★★

## mp3.box

mp3.box is the MP3 wing of the box.sk network. It has plenty of downloads, info and news on what's happening in the world of MP3, and provides an extensive range of links, from software for encoding and playing MP3s to lyrics and hardware.

This site has various top 40 MP3 charts, compiled by mp3charts.com (<http://www.mp3charts.com/>), which ranks songs according to the number of downloads across several Web sites. The number one Australian song when I visited the site was 'Pan Sapiens' by Nympho Mermaids.





mp3.box has a section that lists free legal MP3 downloads from various artists, the majority of whom haven't yet forged a name for themselves in the music industry. It also provides free promotion and Web hosting, which allows the music of unsigned artists to reach thousands of people.

So how good is it for actually finding MP3s to listen to? I decided to check out one of the featured bands, Seventh, which is from "a small country town somewhere in Australia". As well as the usual PR drive about the band, mp3.box claimed to have exclusive full-length tracks. This impressed me, and the music was OK, but the download suffered transfer errors and it took six attempts to download the entire file. The MP3s were encoded at 128K which provides good quality sound while keeping the file size relatively small.

The MP3 format is a good way to introduce music to fans, but its real usefulness lies in the number of live recordings that can be found online with little effort. And the fact that mp3.box doesn't cheat the artists of royalties makes it easier for MP3 moralists to swallow.

This site makes a good attempt at stringing everything MP3 together.

Jon Kinred

Online <http://mp3.box.sk/>  
Rating ★★

## MP3.com.au

MP3.com.au not only provides you with music from lesser-known artists, but also with the software you'll need to play the files, news on upcoming new releases and



music charts to keep track of your favourite songs. There is even a shop section where you can buy all the latest MP3 hardware, from personal devices to car players.

When searching for the desired music, you can choose to search by genre, artist and location. Each artist has a brief his-

tory, track listing and rating. There are also links for more information about the artists or links to their Web sites.

Ryan Shaw

Online <http://www.mp3.com.au/>  
Rating ★★★

## Surfbaud: Copyright, copyleft

It is well known that it is illegal to rip MP3s off your favourite CDs and email them to your friends, just as it has always been illegal to mix tapes for your friends or tape videos from *rage* on a Saturday night. Organisations such as the Recording Industry Association of America (RIAA) have painted MP3s as a threat to the music industry. However, the picture is not as one-dimensional as it seems. In the same way as hypertext publishing has reduced the costs of publishing and turned many writers into self-publishers, MP3s have enabled many musicians to bypass the major recording labels and self-publish their work. The high cost of publishing, distributing and marketing music on CDs has given record labels a lot of power over popular taste for music. MP3 allows music to bypass the labels, and go directly from producer to consumer. Many of the musicians releasing MP3s are happy to have their work heard, and are unconcerned by the lack of revenue, because they have far more control over the final product than a record label would ever allow them.

Public Enemy is widely known as one of the first established groups to turn away from the major recording labels in favour of releasing music as MP3s, and their song 'Swindler's Lust' is about the control those labels have had over black musicians and their work. Closer to home, a group of Sydney musicians have formed the mpfree project to distribute their music. The mpfree Web site, hosted by Community Activist Technology (CAT), has a ticker saying "If creativity is the field, then copyright is the fence." mpfree has chosen MP3 as a format because it rejects the notion of copyright on both ethical and practical grounds. mpfree believes copyright relies on a false notion of the origin of ideas — they don't spring forth from the head of an individual, but arise out of rich and complicated culture. A document elsewhere on the CAT site, linked by mpfree as an explanation of its anti-copyright stance, gives the example of

the Rolling Stones, whose sound seemed original to UK teens but had borrowed heavily from black R&B. The assumption that an idea is created by a lone individual allows that individual to decide who else can use it and benefit from it, ignoring the contribution of others to that idea. mpfree also claims that copyright only protects the major record labels and more successful musicians such as Madonna or Michael Jackson, because it is unlikely that an independent artist could successfully defend the copyright of their work from a record label. Instead of copyright, mpfree advocates "an ethical stance where artists acknowledge their sources and allow others to make use of their own work in the name of creativity". Organarchy, one of the groups involved in mpfree, has also released some of its material on CDs.

Does MP3 really threaten the interests of the major record labels? The results of a survey by Forrester Research released in March indicate that MP3s may actually be boosting the sales of CDs. Almost 60% of people who had downloaded MP3s still bought the same number of CDs, and another 20% are buying more CDs now having listened to MP3s. Many online CD shops are aware of this trend, and allow music to be heard as MP3s or other file formats before buying. Ironically, this practice has been threatened by a patent lawsuit, filed against Amazon.com by Intouch, which claims to have a patent on the practice. Perhaps the RIAA could better serve its members, and support the online CD shops, by fighting against this patent claim.

Glenn Phillips

- Recording Industry Association of America  
<http://www.riaa.org/>
- Public Enemy  
<http://www.publicenemy.com/>
- mpfree  
<http://www.cat.org.au/mpfree/>



# The portal lover's dictionary

**W**e've all heard of portals, a slightly 1997 conception of what the future of the Web might look like. (Telstra is still building one.) Many of us have even heard of vortals, which are vertical industry portals or pages with lots of stuff relating to a particular area. Sports information sites have shamelessly begun branding themselves as sportals. But frankly, we're only scratching the surface when it comes to stupid portal-related puns. Here are a few suggestions rounded up by Chip Chat:



**boretal** not very interesting, really  
**chortle** humour's home online

• **coleslawtal** fondly recalling those salad days

**coretal** a site about Apple's internal hardware designs

**daughtal** info for daughters and the people who love them

**doortal** your entry point to the Web

**foughtal** as in: I foughtal law and elaw won

**fwooar!tal** porn, frankly. Also **porntal** and **hardcoretal**

**goretal** horror movie central

**horizortal** a vortal viewed from a different angle

**hosportal** a pretty sick idea

**immortal** the Net is a permanent archive, except it isn't

**lawtal** legal information. Also **tortal** and **courtal**

**mooreslawtal** the processing power needed for this site to double every 18 months

**moretal** additional data we forgot to include earlier

**mortal** we all die eventually, you know

**noughtal** site with nothing on it. Also telstra.com

**ORTal** Boolean logic for everyone

**oughtal** a place to keep your to-do lists

**pawtal** gone to the dogs already

**pawpawtal** a tropical fruit bonanza

**poortal** for the Web underclass

**portaportal** a small portal that fits in your wallet

**rawtal** pure unprocessed information

**roartal** has the lion's share of the market

**rortal** ripped off!

**sawtal** hardware info (no, not *that* kind of hardware)

**scoretal** not as tacky as it sounds

**scorntal** where derision reigns supreme

• **timshawtal** but wait, there's more!

**shortal** resources for vertically challenged people

**shoretal** a good place to surf

**snortal** the definitive e-cocaine resource

**sporetal** how some plants reproduce

**suretal** the uncertainty principle

**taughtal** stuff what we learned online

**thoughtal** just this idea we had

**wartal** you should really seek treatment

**whoretal** we're saying nothing



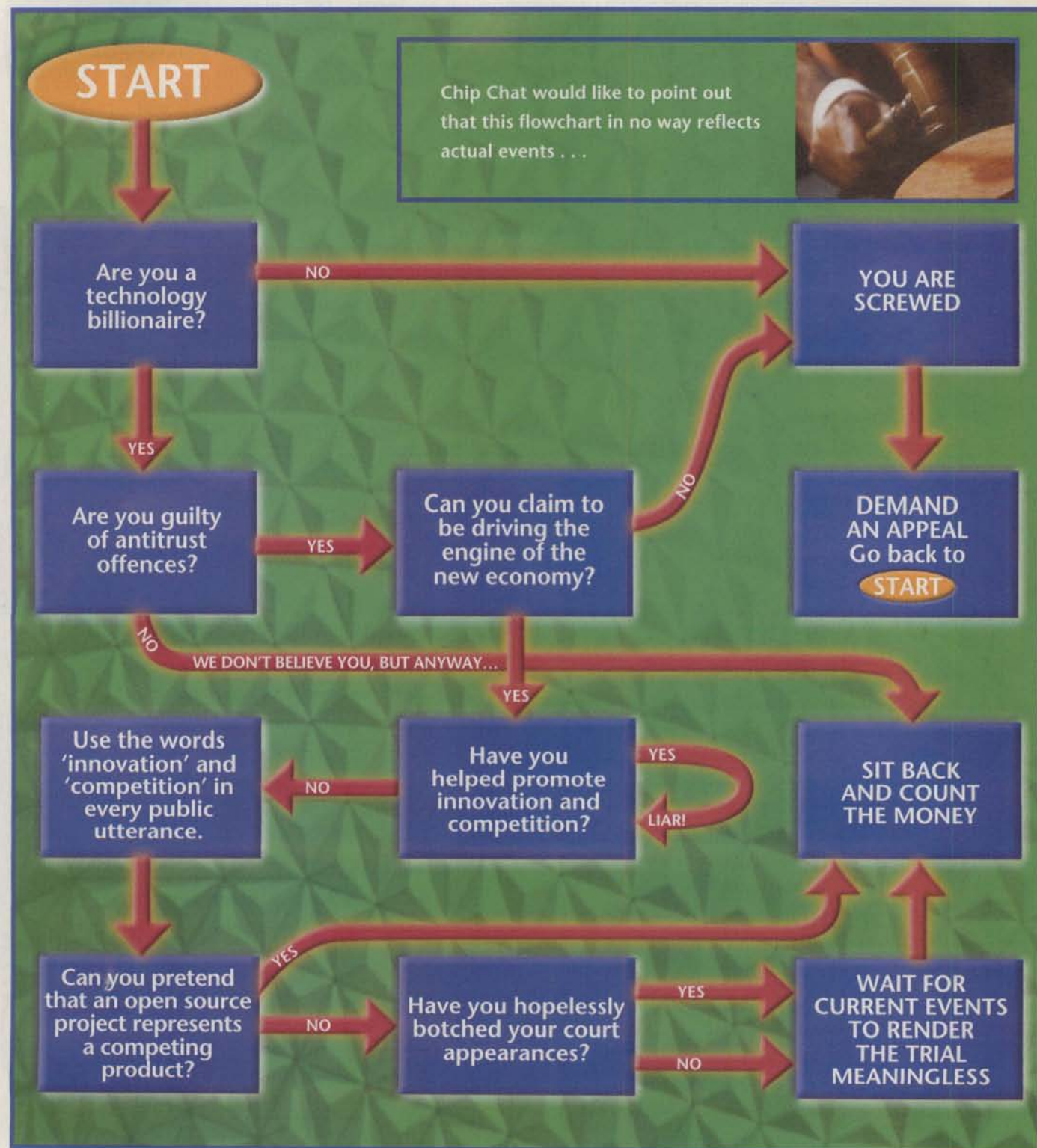
## Cybersquatters take note!

When Chip Chat checked, only 11 of the above suggestions had been claimed as domain names. Scarily, **snortal.com** was one of them.



It could happen — any morning now, you could wake up and find yourself subject to an unexpected antitrust suit. Defend yourself with Chip Chat's handy guide.

## How to win *your* antitrust war







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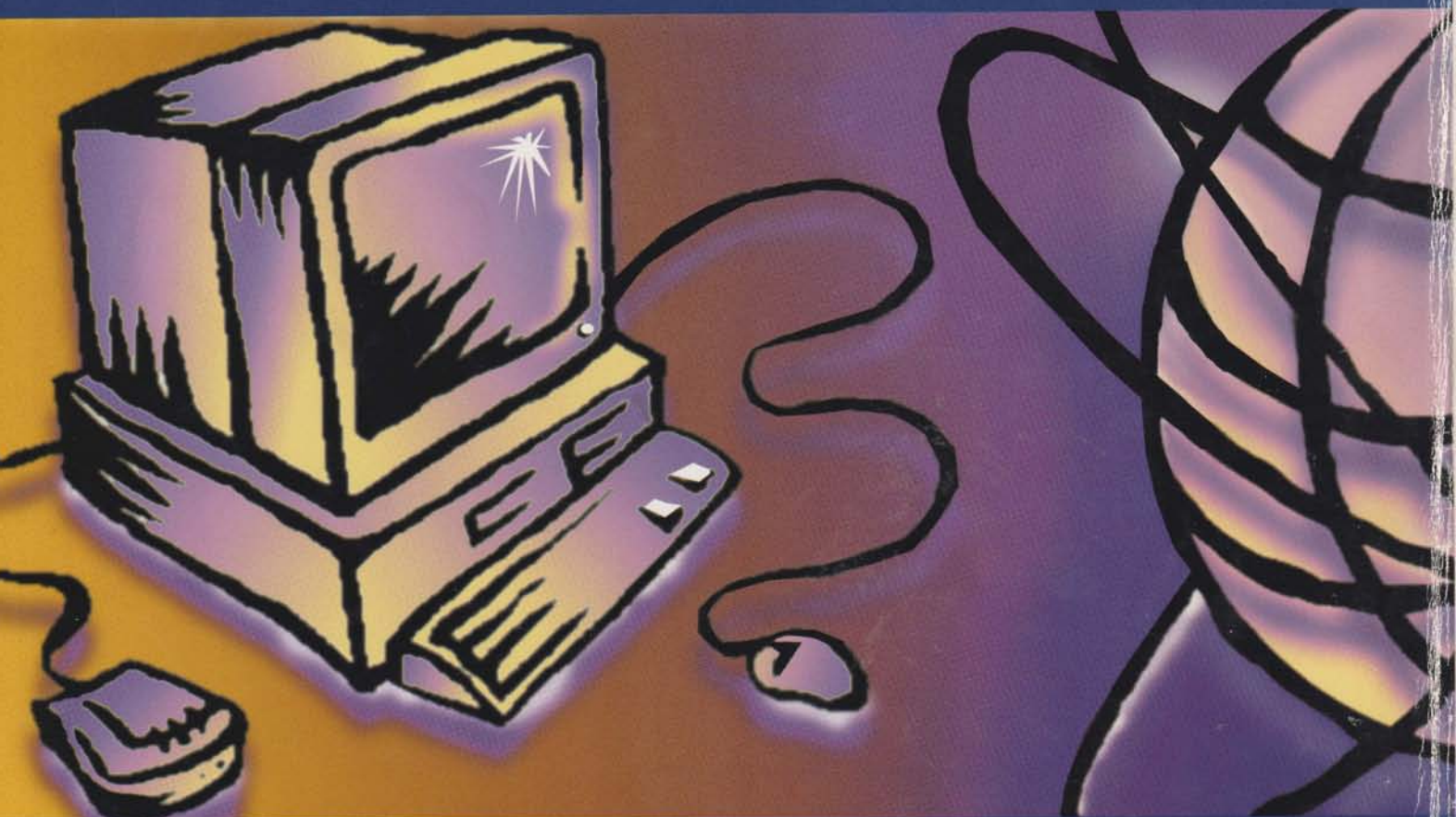
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